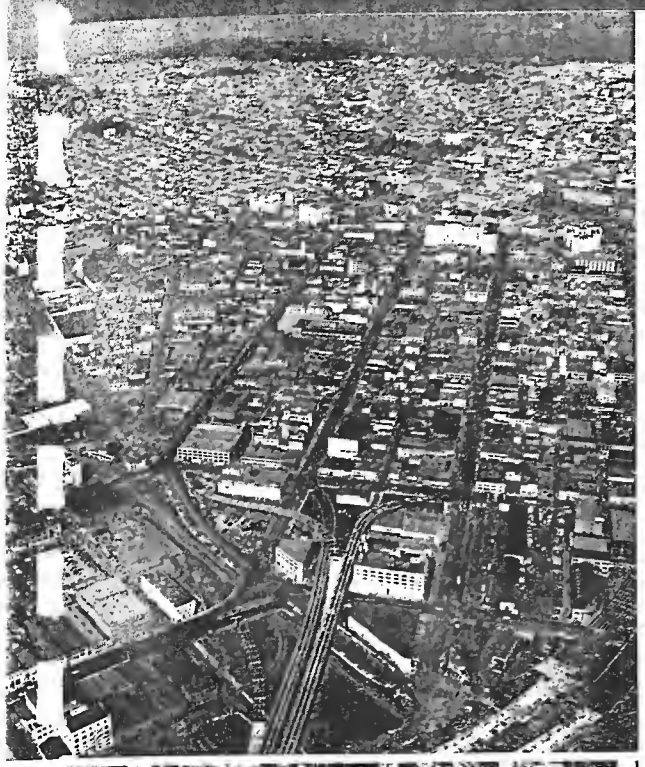
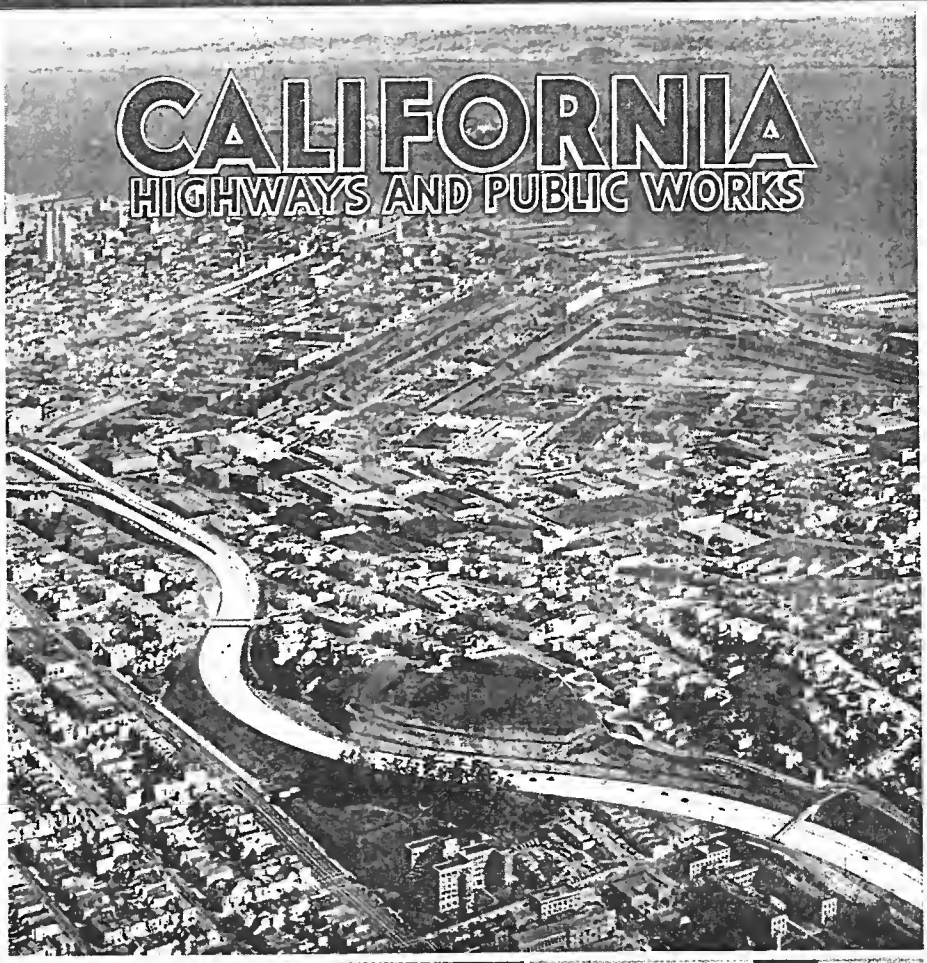
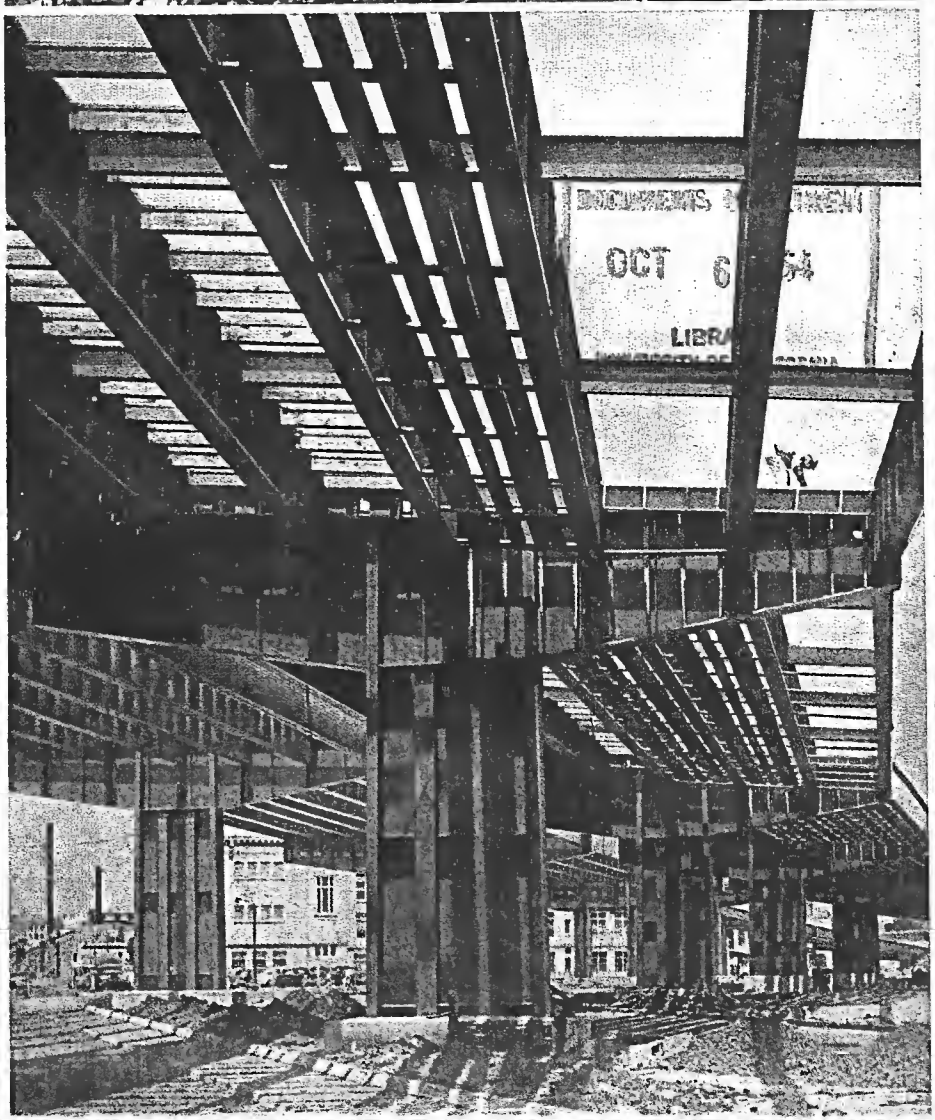
CALIFORNIA
HIGHWAYS AND PUBLIC WORKS







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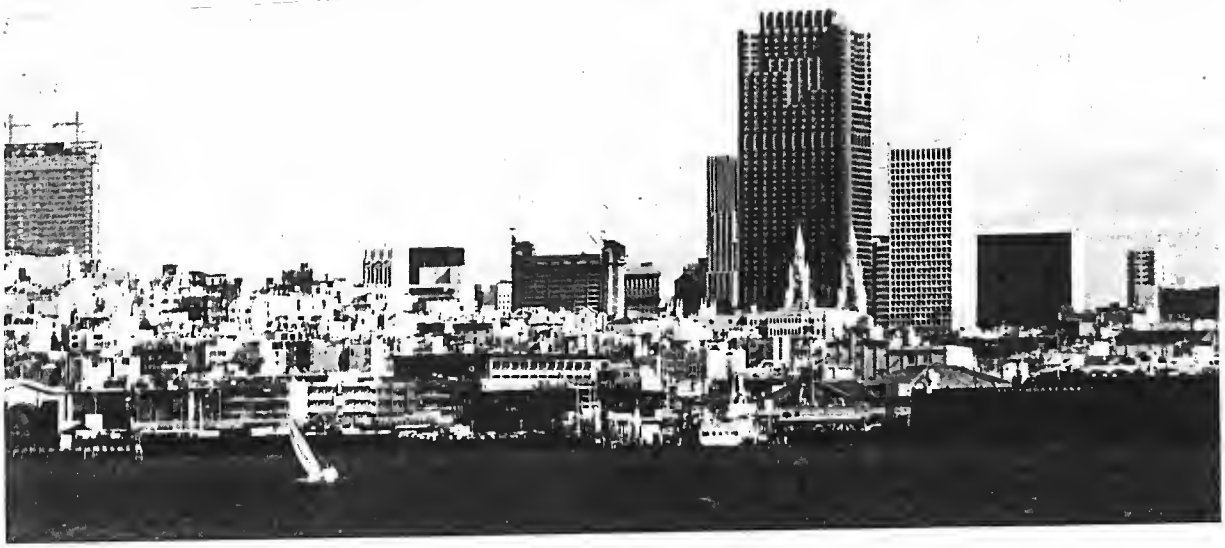

San Francisco Skyline 1960

San Francisco Skyline 1971

California Highways and Public Works

Official Journal of the Division of Highways, Department of Public Works, State of California

KENNETH C. ADAMS, *Editor*
HELEN HALSTED, *Associate Editor*
MERRITT R. NICKERSON, *Chief Photographer*

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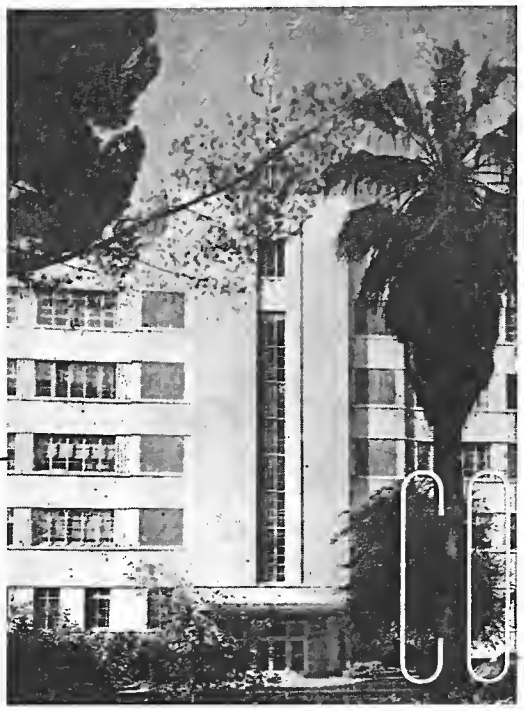
1954



Public Works Building
Twelfth and N Streets
Sacramento

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KENNETH C. ADAMS, *Editor*
P. O. Box 1499
Sacramento, California

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Jul - Ag 1954

Skyline

San Francisco Freeways Provide Panoramic Views

By HERBERT S. MILES, Assistant District Engineer

THE WORLD FAMOUS skyline of San Francisco is a heritage of which the city by the Golden Gate has long been proud. Less than two decades ago many of the travelers destined for the city completed the last lap of their trip on a ferry, which afforded them an excellent opportunity to view this scenic splendor.

With the loss of the ferry boats, this beautiful approach to the city is all but vanished. The evolution of transportation shaped the portal picture into long lines of automobiles and busses traversing heavily-burdened roads and bridges. While passengers in vehicles entering from the north and east caught glimpses of the San Francisco skyline from the bridges, those approaching from the south were confined to a view of the immediate roadside development.

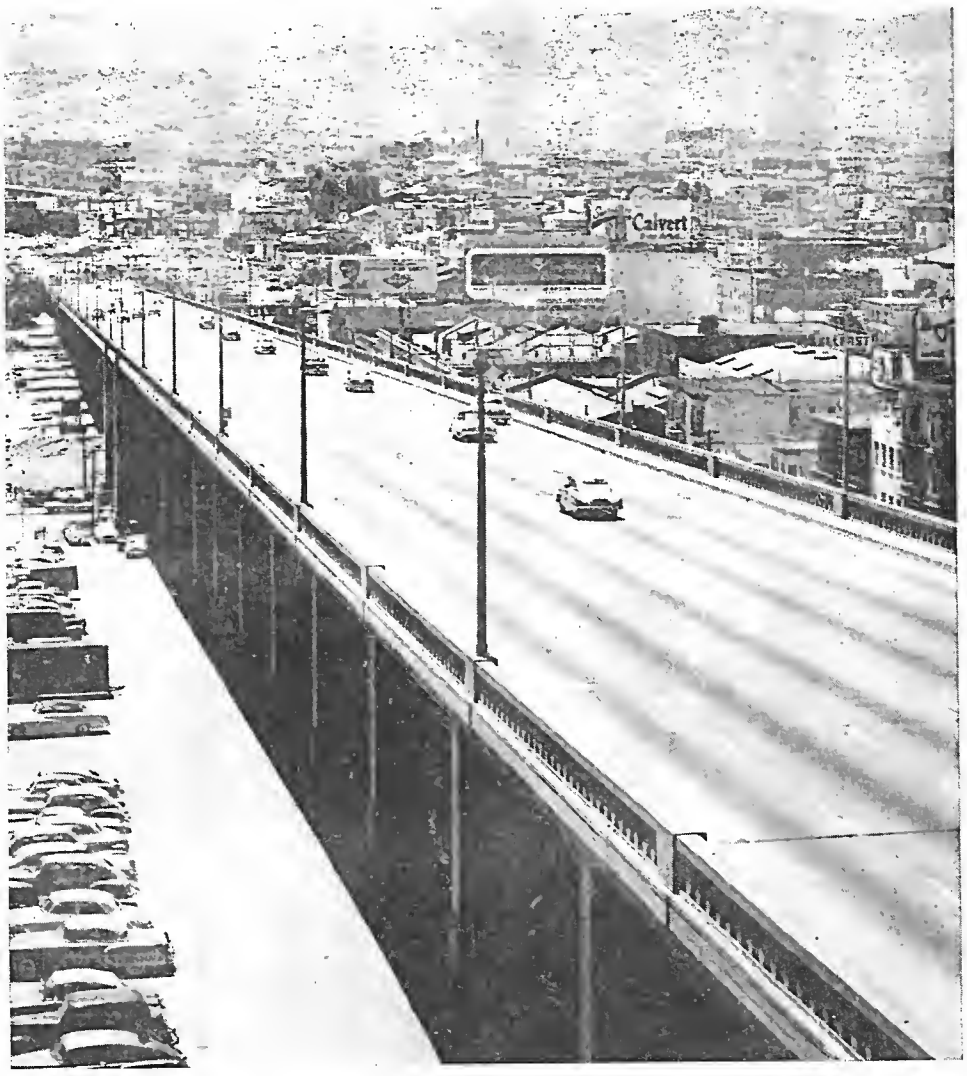
We are now in a transition to a new phase of transportation in this region, the Bay area freeways. As these are developed, the beauty which has long been San Francisco's fame will not only be restored to view, but will be unfolded to motorists entering from all directions. The recently completed section of the Bayshore Freeway between Army and Bryant Streets has opened an entirely new vista. Motorists skirt Potrero Hill on wide curves, and as they approach the elevated portion of the facility, a panorama of the imposing city skyscrapers develops with breathtaking suddenness.

Contracts Underway

This structure is the first link in a system of skyways which will provide a circumferential route around the central downtown district. The completed unit is a portion of the Bayshore Freeway which extends northerly from 17th Street to Bryant Street. This summer another section will be opened which will continue the roadway easterly to Seventh Street. Construction is also progressing on two additional contracts which, when completed next year, will extend to Third Street and also provide a connecting link to the San Francisco-Oakland Bay Bridge. Later this year, a call for bids will be made for the building of a subsequent unit with ramps which will reach to Main and Beale Streets at Mission Street. This latter project, the first section of the Embarcadero Freeway, will be extended northeasterly in the future to the waterfront, and thence will continue along the Embarcadero. Plans now on the drafting board reach north to the foot of Broadway. Studies to be made in the future will have as their objective the further development of this route toward the Golden Gate Bridge.

The present Bryant Street terminus of the Bayshore Freeway will soon take the form of a wye. From this lo-

Looking westerly toword Twin Peaks from the Boy Bridge Fifth Street romp. The elevoted connection to the Boyshore Freeway now under construction is shown in the distonce.



Entering the city from the south the elevated structu

cation a skyway unit is rapidly taking shape which extends northwesterly along Thirteenth Street to Mission Street. Also on the drafting board are additions which will continue northerly to Turk and Franklin Streets. These additions as well as the units of the Embarcadero Freeway which are now being planned will be constructed with a two-level structure design with their dual roadways separated vertically. This type of construction will make it possible to provide for eight lanes of traffic with a minimum taking of property and with the least interference with traffic on cross streets during the construction period. Thus progress is being made on an ultramodern highway facility fully separated from city traffic, which ultimately will provide a connection between the main traffic arteries of San Francisco, the Bayshore Freeway and the two bridges.

Bayshare Freeway averlaaking Patrera Avenue. Galden Gate Bridge and Marin Hills in distance.

Ultramodern Design

The section now in service and adjoining units in the construction stage are also ultramodern in design from a structural and architectural standpoint. The superstructure is fashioned with streamlined supports and girders of all-welded steel construction. This is the longest bridge project yet undertaken with a framework that has been assembled without the customary clatter of riveting hammers.

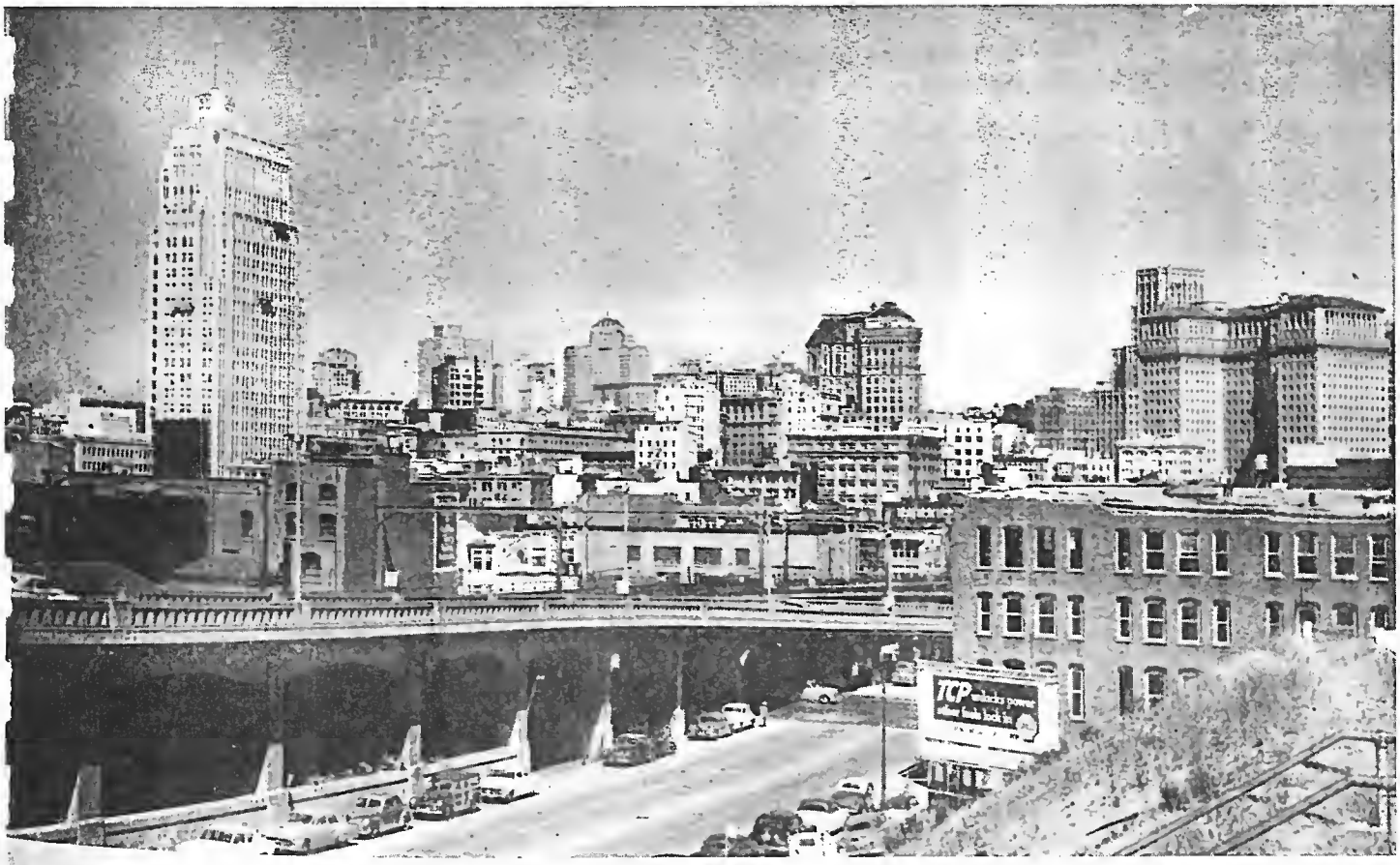
New features have also been incorporated into the deck of the structure. Curbs are of a unique design which includes a continuous recess at the lower part of the curb face. This development is the result of extensive field tests which revealed that the type chosen deflected vehicles which contacted the curb with more safety than types previously used. The rails are also in keeping with the other features of the structure. While they are simple in appearance, they are substantially stronger than former types. Yet they are low enough so as not to obscure the view, thus affording motorists an exceptional vantage point from which to see the great panorama of metropolitan San Francisco.

of the freeway merge with the San Francisco skyline

While the primary purpose of this forward step in urban transportation s the expeditious movement of motor ehicles, the importance of aesthetic values involved is fully appreciated. The elevated roadways will form ompanion structures to the existing elements of the skyline which were themselves constructed to enhance the beauty of the city. These skyways are been designed with the view to pleasantly blend with their surroundings, and to complement the massive core of this progressive metropolis.

Created to relieve surface congestion, and a part of this metropolitan plan to solve the strangling traffic problem, this type of construction will become synonymous with the City of San Francisco, restoring to its people and to their visitors the opportunities of viewing the city which were lost with the departure of the ferries.

First Street off-romp for dispersal of Boy Bridge traffic into commercial and financial districts



Sep - Oct 1954

BAYSHORE FREEWAY BRIDGE IS JUDGED BEST OF ITS KIND

The Ninth and Tenth Street viaduct on the Bayshore Freeway in San Francisco has been judged by the American Institute of Steel Construction to be the most beautiful Class II steel bridge opened in 1954.

Each year the American Institute of Steel Construction sponsors a competition for the most beautiful steel bridge opened to traffic in the United States or Alaska during the previous year. Class II is for bridges costing over $500,000 and having no span over 400 feet. In making the award the institute said referring to the Bayshore Freeway structure:

"This bridge was acclaimed not only as a winner but as the most imaginative entry because it is an honest structural solution to a difficult and complex problem. There is great harmony in the structure even though both single and double columns are used in the supports. It exemplifies the strength. simplicity and integrity which can be accomplished merely by the use of steel alone."

The structure was designed by the California Division of Highways Bridge Department under Assistant State Highway Engineer F. W. Panhorst. Charles L. Harney, San Francisco, was the contractor and the steel was furnished and erected by Bethlehem Pacific Coast Steel Corporation.

This striking photograph shows the beautiful design of the Ninth and Tenth Street Viaduct on the Bayshare Freeway in San Francisco

Frank Escobedo Personnel Officer Of Public Works

After 2½ years absence during which he was Personnel Director for the City of Philadelphia, Frank J. Escobedo has returned to Sacramento and on September 1st accepted an appointment by Director of Public Works Frank B. Durkee as Departmental Personnel Officer of the Department of Public Works.

Escobedo is a graduate of University of California at Berkeley in Public Personnel Administration. He completed a year of graduate work at University of California's Bureau of Public Administration and had 10 years' personnel experience in California state service, including five years as a personnel officer. He had 3½ years' personnel experience in the U. S. Army, in which his last assignment was battalion personnel officer and adjutant. For the past 2½ years as personnel director for Philadelphia his basic job was to organize, plan, and put into operation a civil service and personnel management program for the city's 25,000 employees.

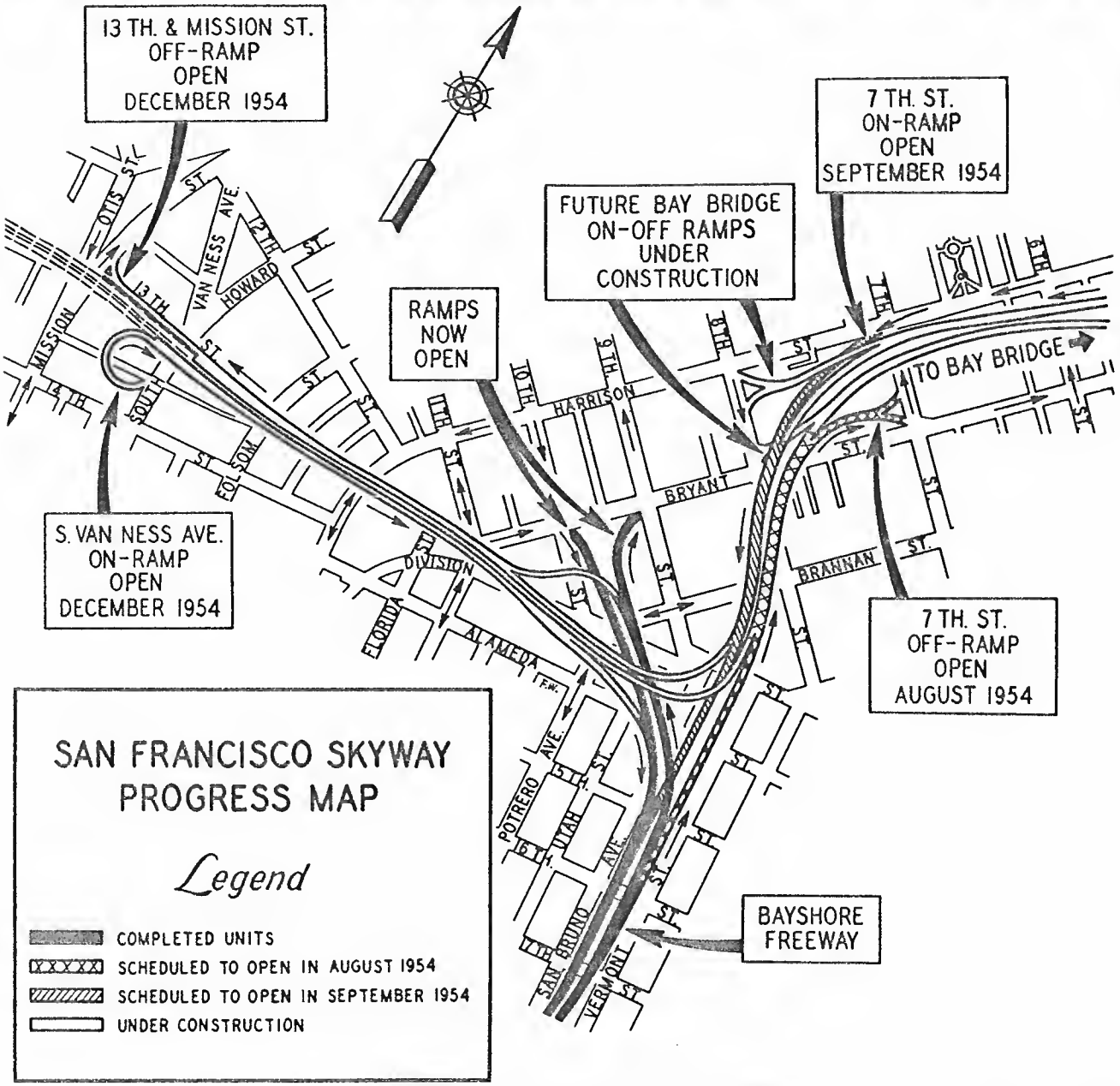
YES, WE DO DRIVE

Californians, on the average, drive about 1,000 more miles per person every year than the rest of the Country's citizens. According to the California State Automobile Association, the figures are: Californians, 4,396; United States average, 3,426.

FREEWAY DRIVING

Don't think that because you're driving on a freeway you can relax your attention. Driving is a full-time job no matter what kind of road you're on.

S. F. SKYWAY PROGRESS SPEEDS UP TRAFFIC FLOW



(Skyway map — courtesy of California State Division of Highways, District IV)

Travelers get a breathtaking view of San Francisco's world famous skyline as they sweep into the city on modern "Skyways"—elevated freeways that will eventually circle the entire downtown section.

Important progress is being made in the Skyway program. The Seventh Street off-ramp, scheduled to open this month, will speed distribution of traffic into the one-way street pattern. The Seventh Street on-ramp will be opened in September. Now under construction, the 13th Street lateral will open at the end of the year, and the Bay Bridge-Bayshore Freeway link will be completed next summer.

Committee Meetings

FLIGHT FESTIVAL — August 9, First floor conf. room, Chamber, 10:00-12 noon.

CONVENTION FACILITIES — August 9, Room 200, Chamber, 10:00-12 noon.
Agenda: Discussion of bond issues.

FLIGHT FESTIVAL — August 16, First floor conf. room, Chamber, 10:00-12 noon.

CONVENTION FACILITIES — August 16, Room 200, Chamber, 10:00-12 noon.
Agenda: Discussion of bond issues.

KEEP S. F. STREETS CLEAN — August 18, Room 360, Mills Building, 10:00-12 noon.
Agenda: Organizaiton meeting.

BAY REGION BUSINESS
WALTER J. BROWN, Editor
Ralph S. Cless, Jr., Ass't Editor
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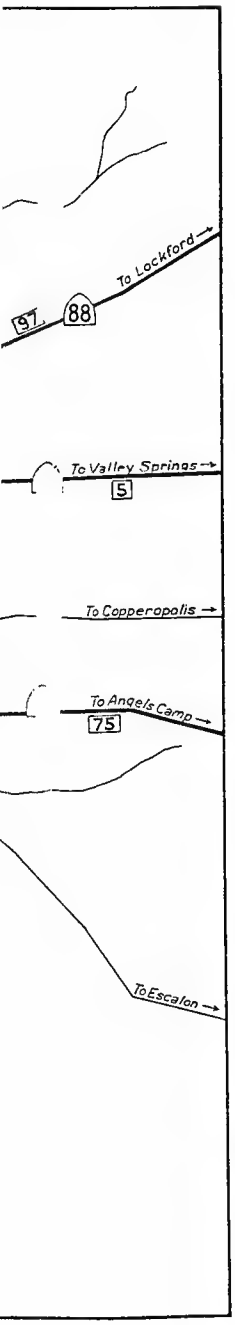

ROAD MAP OF CALIFORNIA

1955

ISSUED BY
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DIVISION OF HIGHWAYS

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ROAD MAP OF
CALIFORNIA
1955

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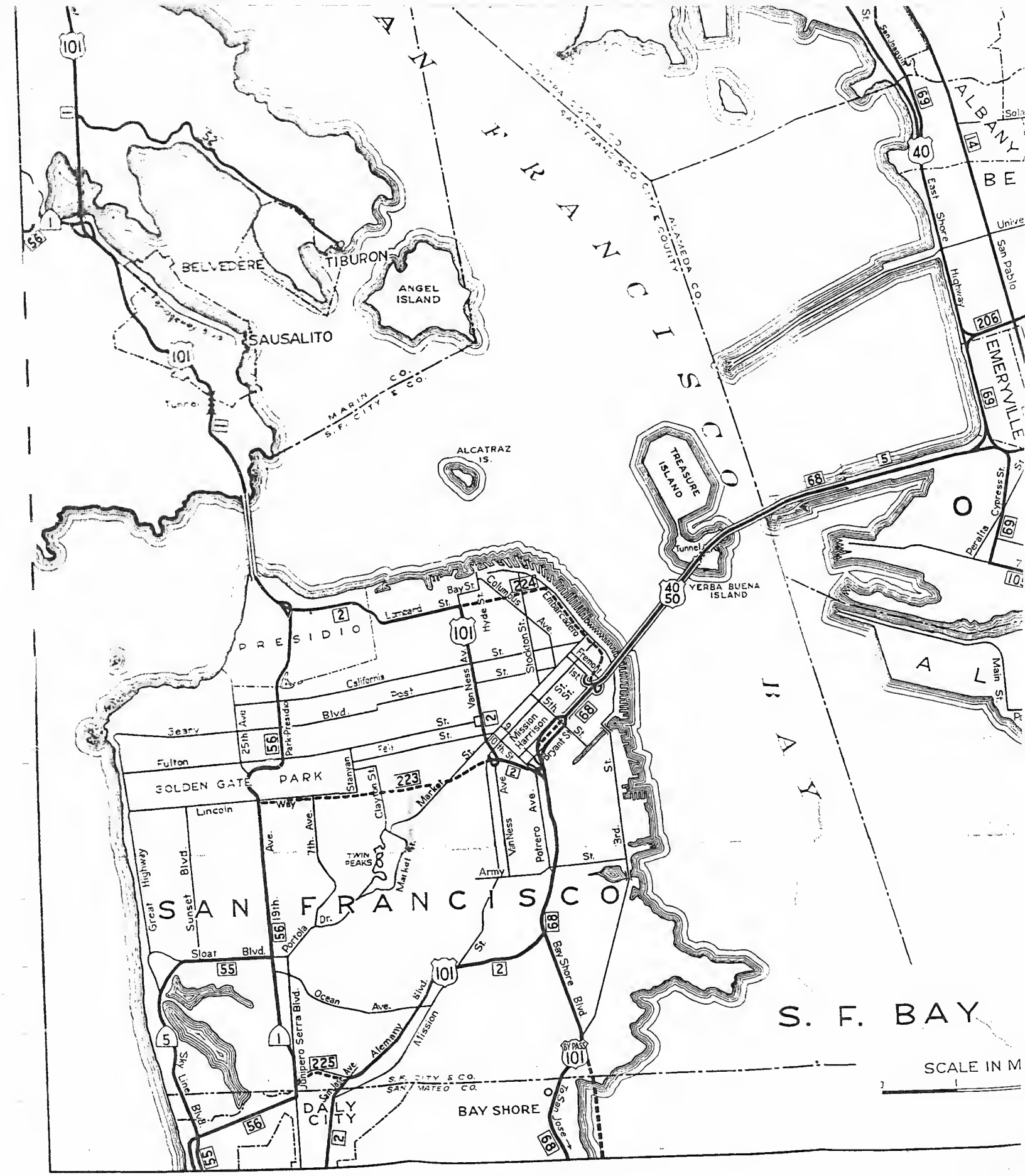
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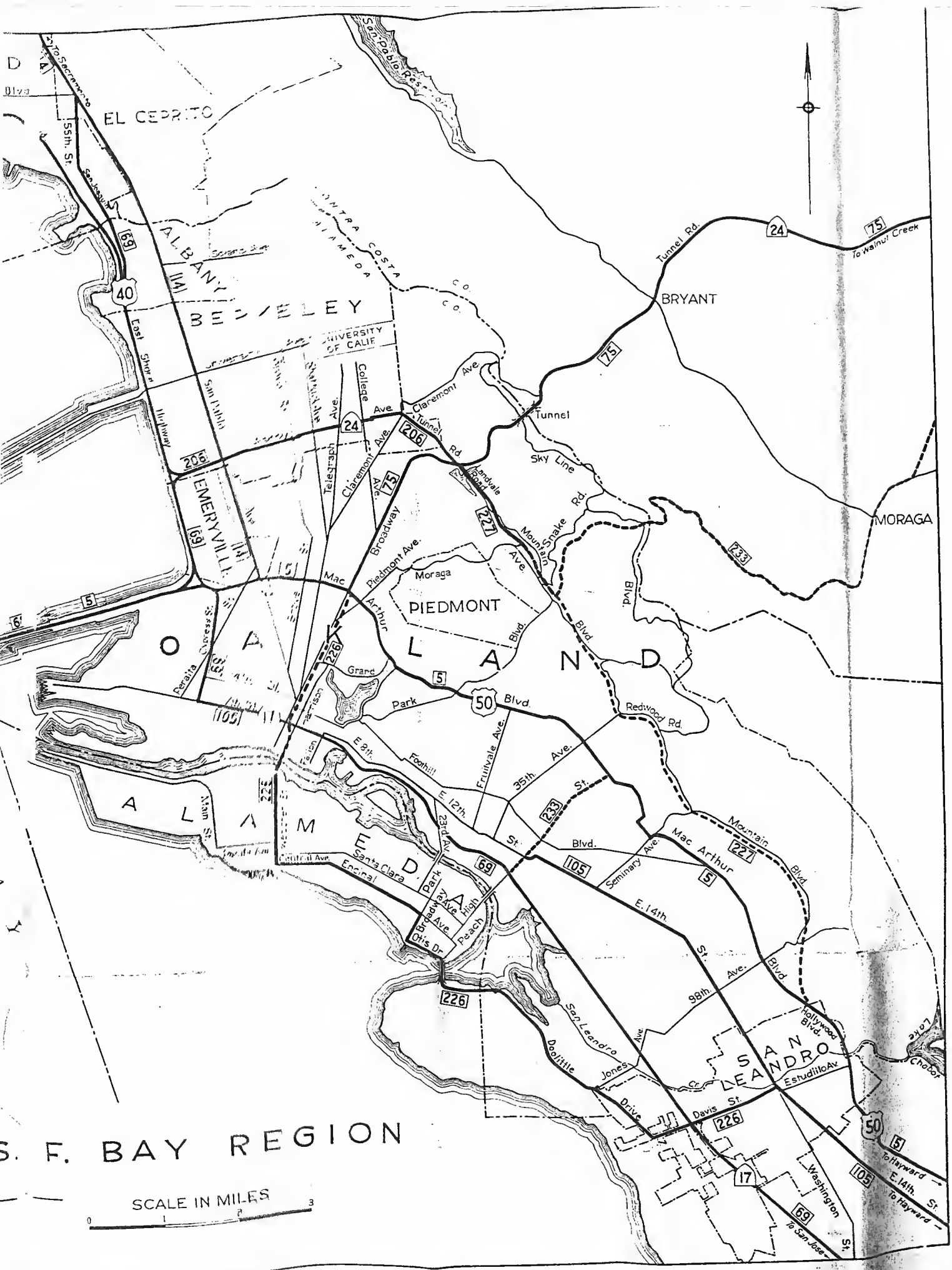
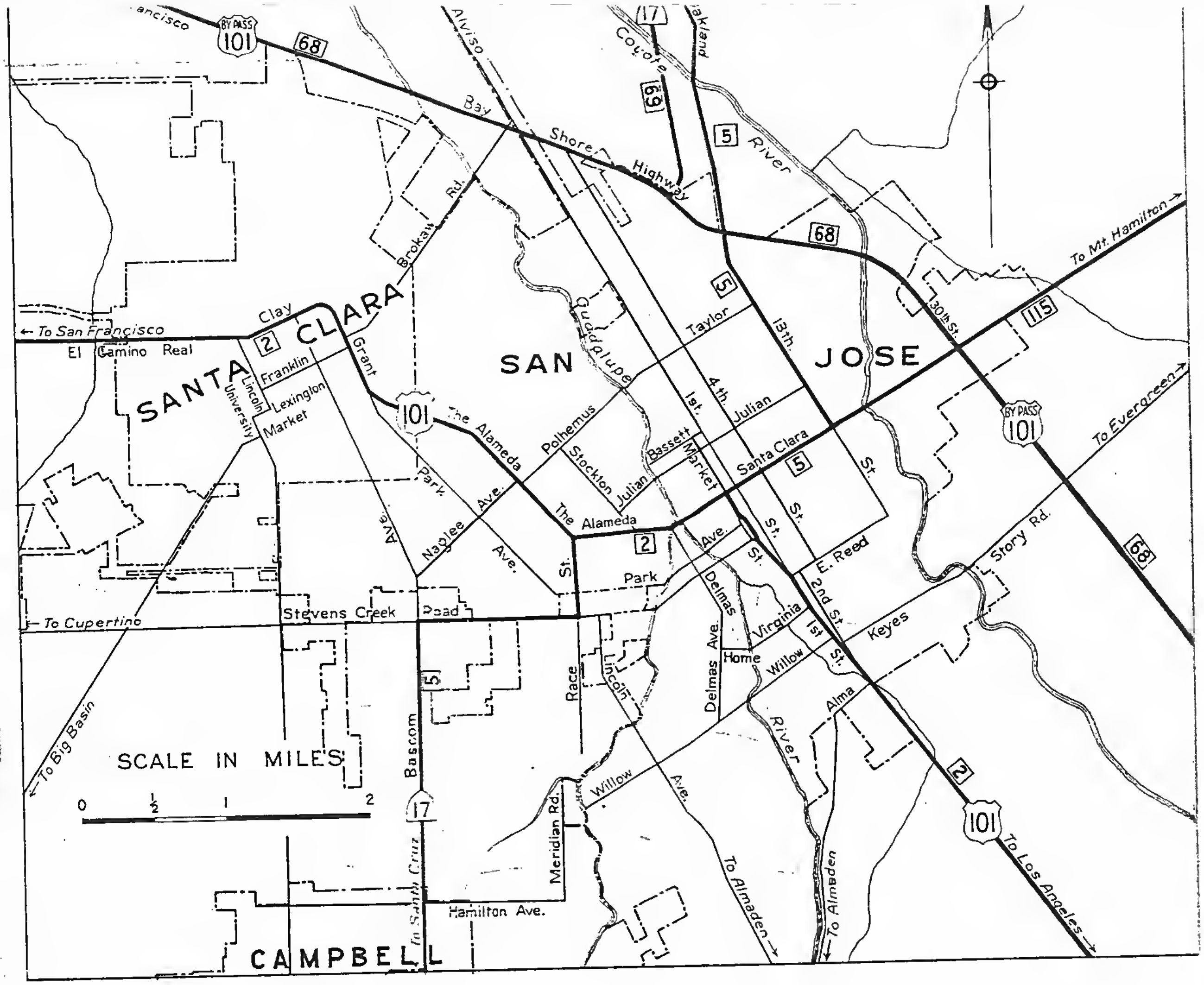


S. F. BAY REGION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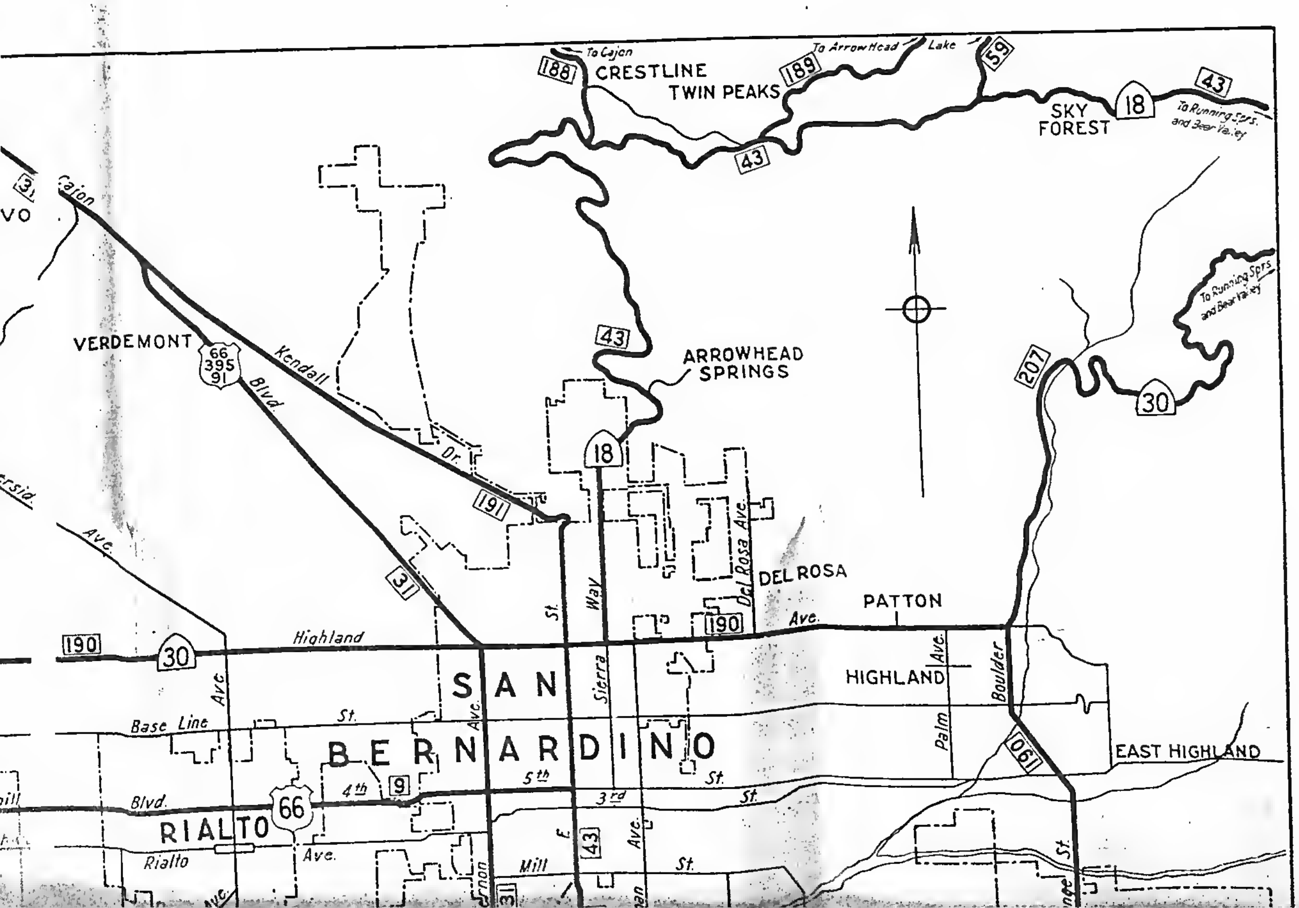
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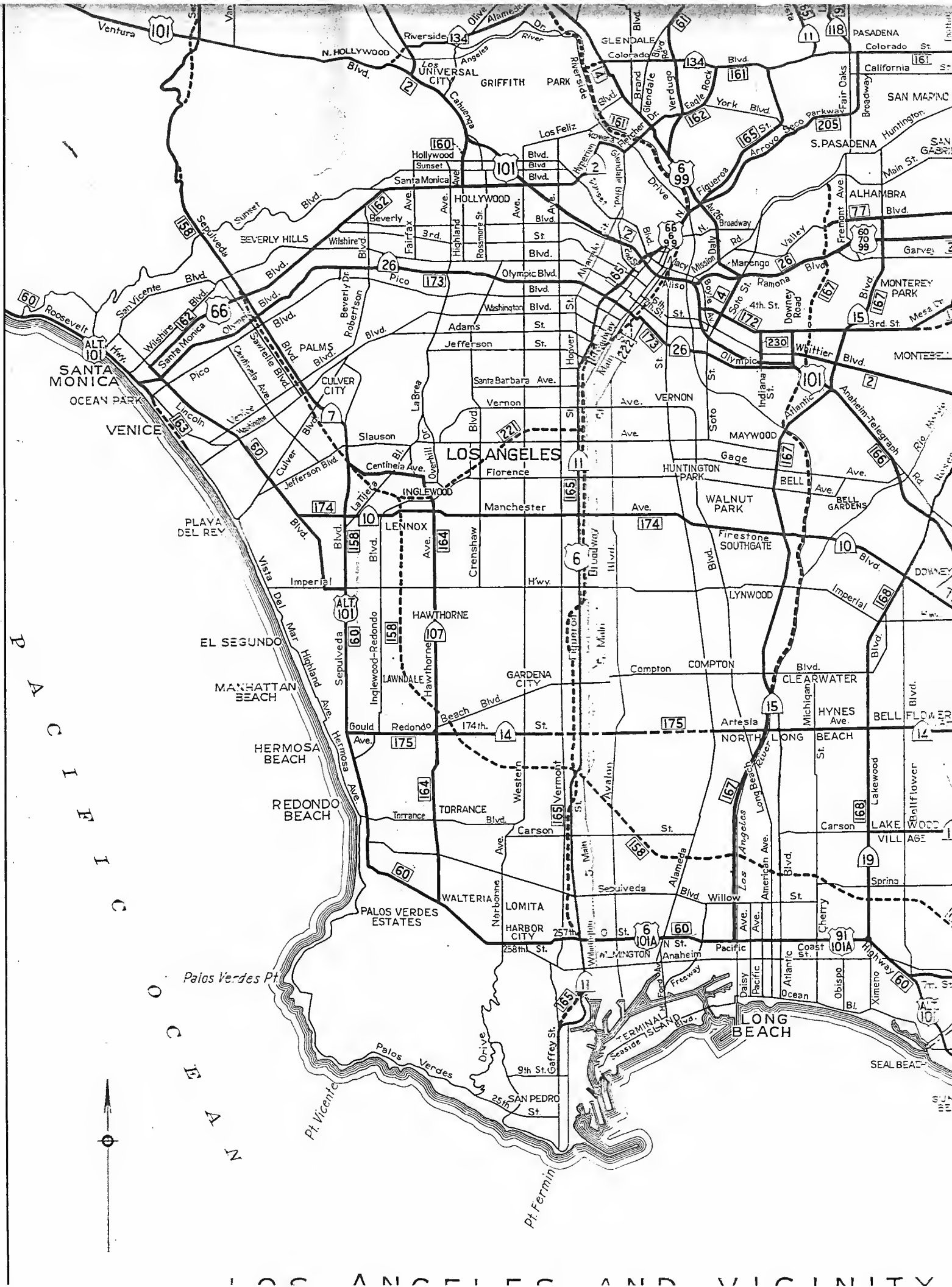

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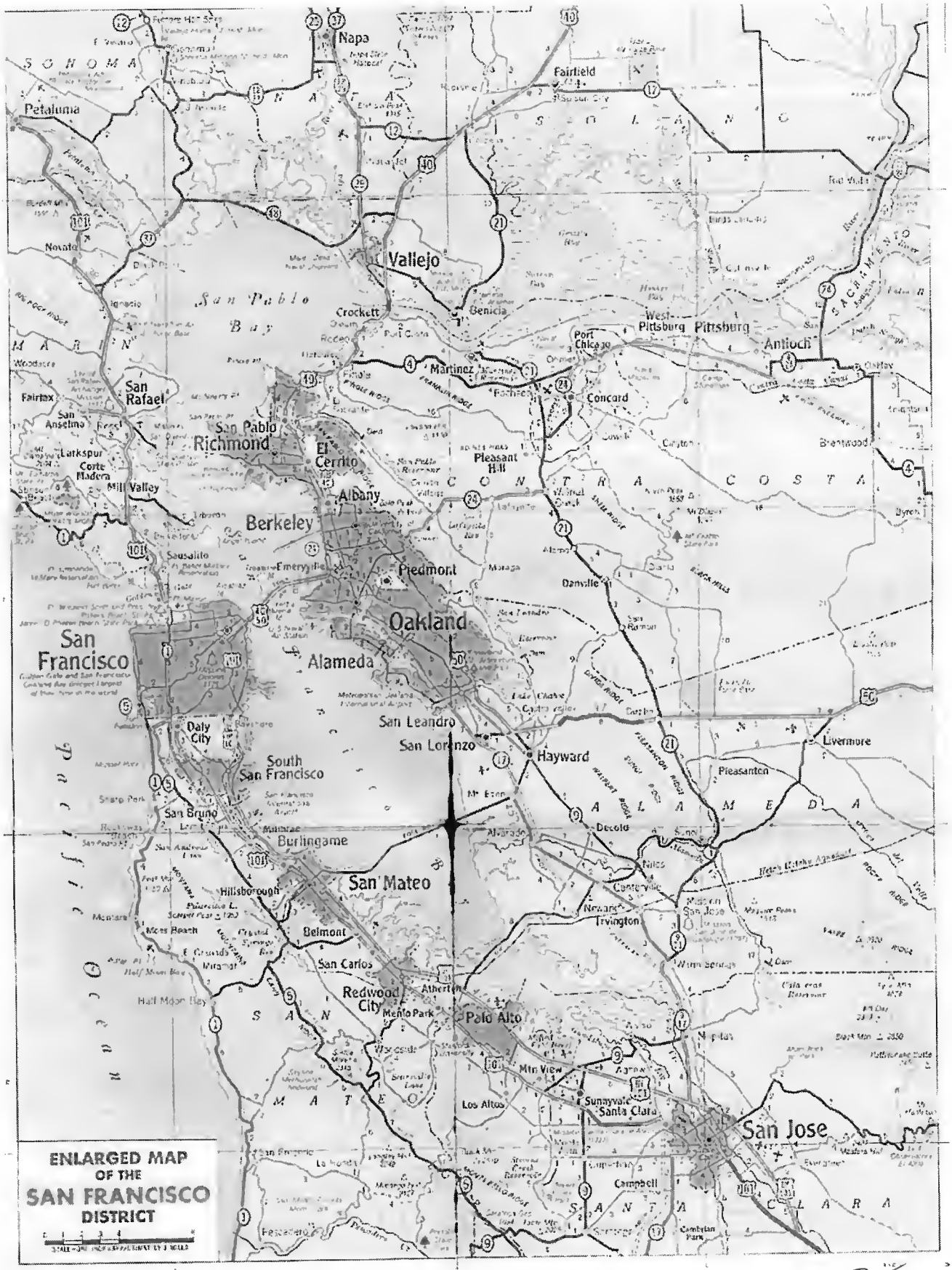
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Piedmont
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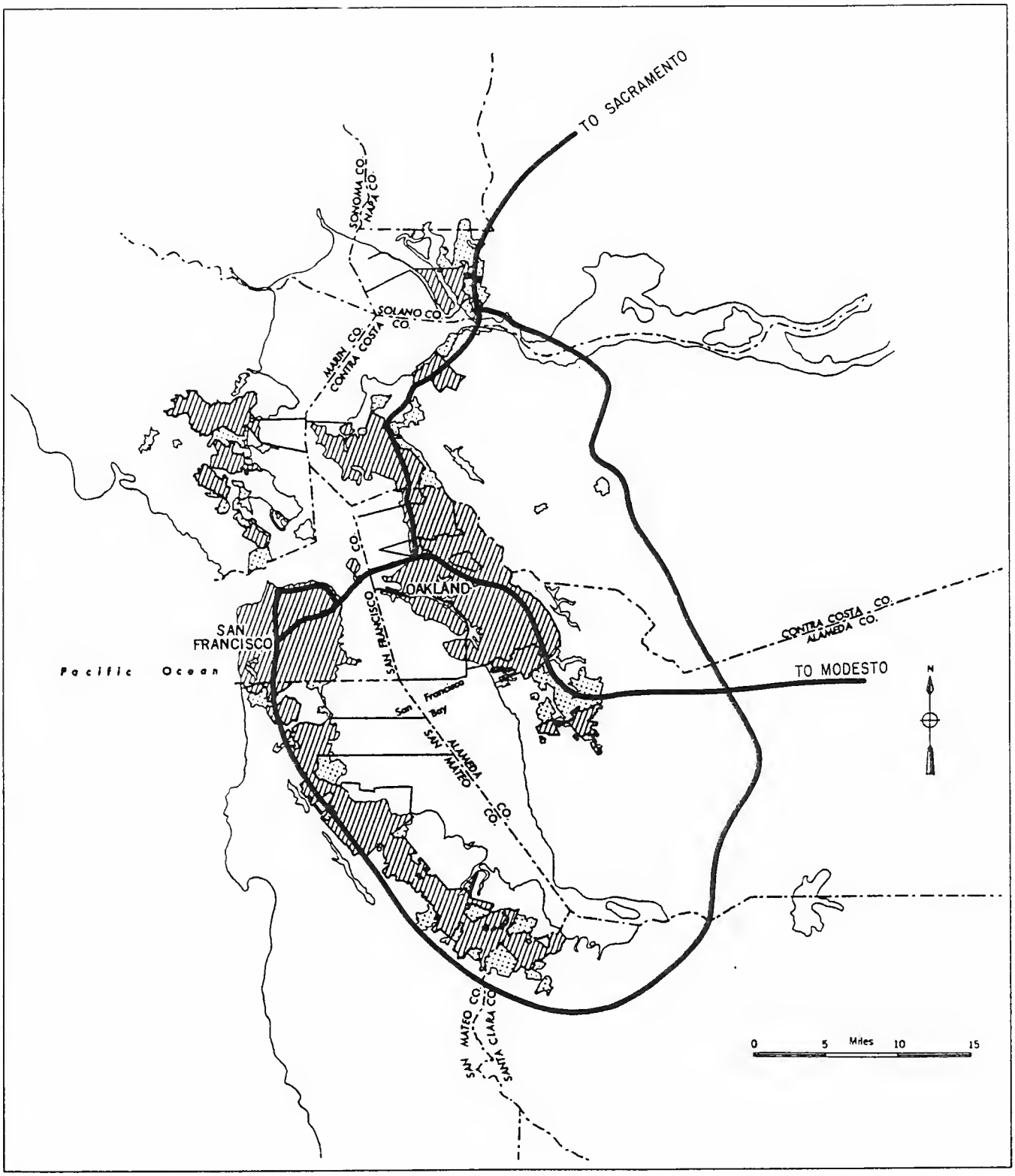
Pleasanton
Daly City
South San Francisco
San Bruno
Burlingame
San Mateo
Hillsborough
Belmont
San Carlos
Redwood City
Menlo Park
Palo Alto
Mountain View
Los Altos
Sunnyvale
Santa Clara
San Jose
Campbell
Half Moon Bay
ENLARGED MAP
OF THE
SAN FRANCISCO
DISTRICT

1955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SANTA CLARA CO.

Mar - Apr 1955

District IV Freeways Make Great Strides

By B. W. BOOKER
Assistant State
Highway Engineer

Developments During The Past Year

THE MARCH-APRIL, 1954, issue of *California Highways and Public Works* reported on the strides which had been made in the construction of freeways in the metropolitan area which surrounds San Francisco Bay. While the groundwork for California's freeway system was laid through enabling legislation which was enacted in 1939, the evidence of the accomplishments which have unfolded from this program became apparent only recently.

The accelerated construction of these facilities through the postwar period now is rapidly being extended into long avenues of modern highways as the initial short stretches of freeway continue to be linked into connected thoroughfares.

Substantial Results

The past 12 months period has produced substantial results in the development of a system of freeways in District IV measured in mileage, expenditures and other terms. One year ago a total length of 140.5 miles of freeways and expressways were carrying traffic in District IV. Since that time an additional 18.1 miles were completed and it is noteworthy that all but 2.3 miles of the additional length were initially constructed to full freeway standards.

The role which these state highway facilities play in helping to solve the transportation problems of a major metropolitan area is significant. In 1951 the San Francisco Planning Commission adopted a trafficways plan as the transportation section of their master plan. The text of this plan, in part, states:

"The trafficways plan of San Francisco is designed as a guide for the attainment to the greatest degree possible of the following objectives:

"1. Adequate provision for the expeditious, convenient and safe movement of vehicular traffic, including rubber-tired public transit vehicles where appropriate, between all neighborhoods, community areas, and working areas of the city, and the gateways leading into and out of the city.

"2. Development of an efficient, economical and balanced system of major trafficways consisting of freeways, major thoroughfares, and secondary thoroughfares, each employed where it is most suitable and effective from the standpoint of present and prospective traffic movement and from the standpoint of the present and desirable future use and development of adjoining land areas.

"3. Coordination of the trafficways system with related transportation plans and facilities of other categories, especially public transit, as well as with other related features and facilities of land development provided for in other sections of the 'master plan.'"

City Planning Report

The San Francisco Department of City Planning in its annual report dated January, 1955, makes the following comment concerning progress on the trafficways:

"Closely related to the city-wide land use plan is the trafficways plan. Adopted July 17, 1951, by the City Planning Commission, it is now beginning to take shape in a rather spectacular manner, through projects being built by the city as well as others being constructed by the California State Division of Highways. Bayshore Freeway, a state project, now nearing completion for its entire length, is adding a new feature to the character of the city.

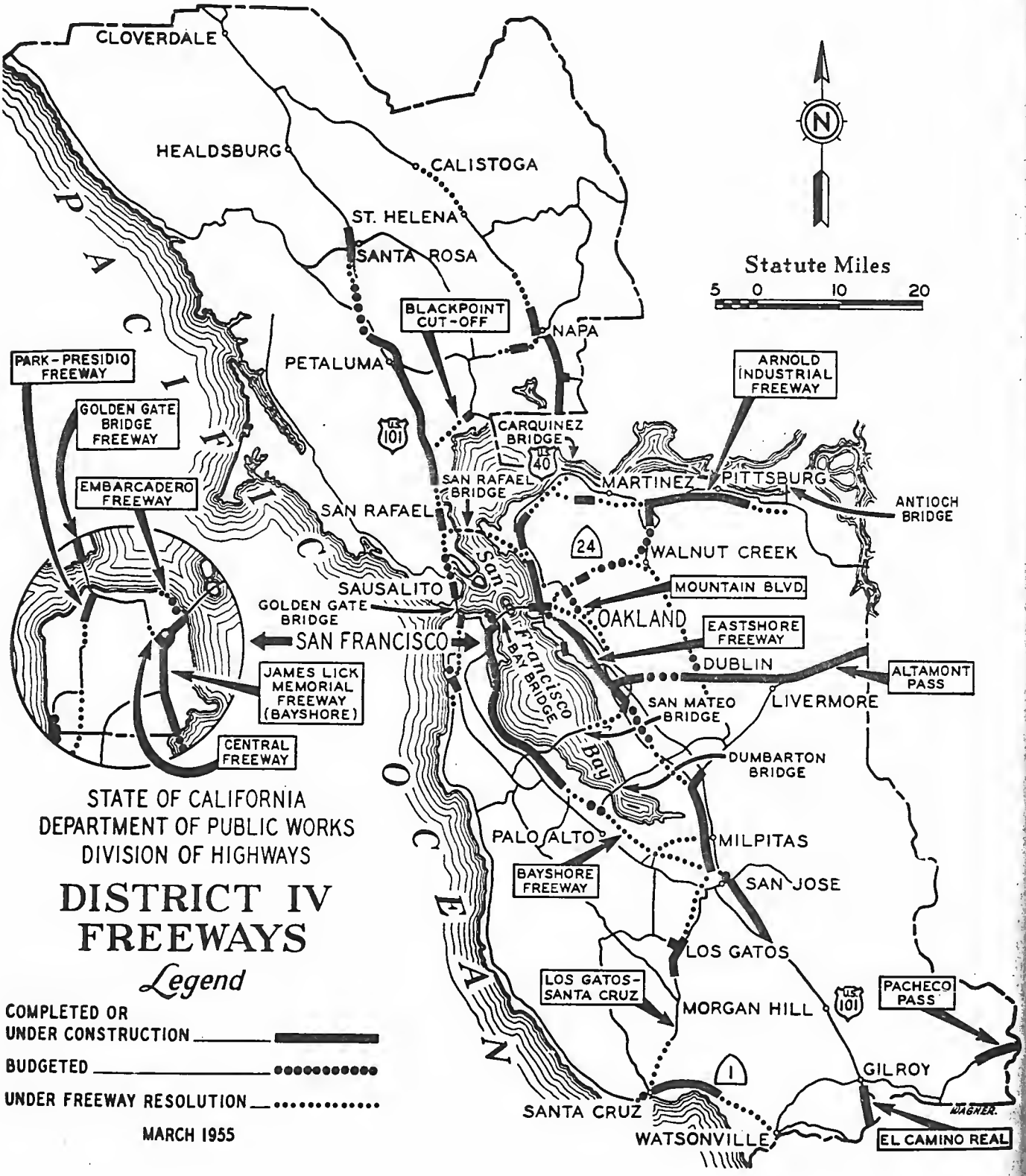
"A national award was recently granted the State Division of Highways for the design of its 'skyways' in the complex 'over and under' pattern of viaducts at the junction of the Bayshore, Central and Embarcadero Freeways with the Bay Bridge in the South-of-Market area. The state engineers have opened up new vistas that can be seen by motorists from these new viaducts, a panorama of imposing city skyscrapers developing with breathtaking suddenness.

Bayshare Freeway Casts

Construction and right of way costs for the 6.4 miles of the Bayshore Freeway in San Francisco come to a total of approximately $39,832,000, of which over $20,000,000 were for the acquisition of rights of way. Total length of structures is approximately 8.4 miles. San Franciscans using this artery can now report average daily time savings of from 10 to 25 minutes per trip. Benefits have likewise accrued to users of thoroughfares formerly carrying traffic now using the freeways. The choking peak hour congestion is gone, and abutting property owners are benefiting from a chance of easier access and less noise."

The annual report of the City Planning Commission of Oakland dated September 8, 1954, also comments on the contribution made by freeway construction in that city. The report states:

"Adopted in 1948, the freeways and major streets section of the master plan sets forth a 20-year program for meeting the needs of the automobile age. The plan provides a well-knit pattern of traffic arteries designed as the framework of the city's circulation system. Since adoption, notable progress has been made in translating the plan into reality.



STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF HIGHWAYS

DISTRICT IV FREEWAYS

Legend

COMPLETED OR UNDER CONSTRUCTION _____

BUDGETED _____

UNDER FREEWAY RESOLUTION .....

MARCH 1955

LEFT—Division Street Interchonge on Bayshore Freeway in San Francisco shawing progress of canstruction an finol units af the freeway which will connect with the Bay Bridge opprooch in the center right of the picture. RIGHT—Looking westerly olang the initiol unit of the Centrol Freeway in San Francisco from its junction with the Bayshare Freewoy at the Division Street interchonge to its present terminus ot 13th and Mission Streets.

"A major traffic bottleneck was substantially relieved with the rerouting of Eastshore Freeway traffic from Seventh and Eighth Street to Fifth and Sixth Streets between Oak Street and Market Street. This was accomplished by the construction of bridges over the Posey Tube approach. These bridges will later serve as on and off ramps for the elevated freeway."

Elevated Roadways

The engineering achievement in providing an artery of high utility from a traffic standpoint has also added to the aesthetic qualities of the metropolis. The elevated roadways of the freeway in San Francisco afford motorists an excellent opportunity to view the splendor of her world famous skyline as they approach the central district of the city. The magnificence of the view has appropriately led to the local designation of the elevated freeway system as "skyways."

To complement the beauty of the vista from the roadway of the skyway structures the construction has attained distinction in yet another manner. The unit of the viaduct first to be finished which terminated with ramps connecting to Ninth and Tenth Streets at Bryant Street was judged by the American Institute of Steel Construction to be the most beautiful Class II steel bridge opened in 1954. This award was on the occasion of an annual nation-wide competition which includes bridges costing over $500,000 and having no span over 400 feet.

Forty-five Contracts Under Way

As of March 1, 1955, District IV had a total of 45 construction contracts under way which represent a construction cost totaling $62,300,000. A number of these projects cover improvements of a conventional highway type including those which are minor in scope. However, 26 of the jobs are for construction of full freeways on an additional 41.0 miles of modern facility at a cost of $58,764,000.

With the revenue now anticipated, financing is provided for construction and acquisition of right of way totaling $60,893,000 in District IV during the 1955-56 Fiscal Year. Of this amount, $57.170,000 has been allocated for freeway type improvements. Thus in the Bay area, in excess of 90 percent of the current and programmed funds have been and will continue to be expended for freeway development.

The accompanying map illustrates how the freeway routes are encircling the Bay and are radiating out from the metropolitan area to the north, east and south. The development of these routes together with the six existing bridges and with the Richmond-San Rafael Bridge now under construction, is gradually contributing to the breaking of the barrier imposed by the geography of the Bay area. At the same time progress on this combination of facilities is adding to the convenience and safety for large volumes of traffic in their movement between residential and occupational centers of the region as well as for other users whose needs are served by a highway transportation system.

The items which follow cover highlights of the progress during the past

12 months in the development of a system of freeways in District IV, together with information concerning future projects for which financing has been provided:

BAYSHORE FREEWAY

An important unit of the Bayshore Freeway in San Francisco between Sixteenth and Seventh Streets was placed into service when the northbound lanes were opened on July 20, 1954, followed by opening of the southbound lanes on August 27, 1954. The roadways are carried on elevated structures of all-welded steel construction similar in design to the adjacent award-winning section of the skyway.

As the previously completed section of the freeway concentrated the bulk of the traffic on the on and off ramps connecting with Bryant Street at Tenth and Ninth Streets, the new section materially relieved the congestion on the terminal ramps and clearly indicated that further freedom of movement could be anticipated as ramps on subsequent sections are made available. The work on this 0.7-mile project was done by the Guy F. Atkinson Company at a cost of $3,230,000.

Immediately east of the finished portion, work is nearing completion on two subsequent contracts. The unit from Eighth Street to Fourth Street, which was started in October, 1953, extends over a distance of 0.7 mile and will provide on and off ramps at each end of this unit. Charles L. Harney, Inc., is the contractor on this $3,900,000 project.

Other Units

The other job is 0.2 mile long. between Third Street and Fifth Street. The work which is being performed by Eaton and Smith at a cost of $830,000 will provide a connection with the San Francisco-Oakland Bay Bridge and will later furnish a tie to the future Embarcadero.

To the south of the first unit of the Bayshore Freeway which was completed in San Francisco, work has been under way on a 1.7-mile contract which was awarded to Charles L. Harney, Inc., on May 25, 1953. This $2,400,000 project will be completed this July. The freeway lanes have already been opened to traffic and the only work which remains to be done is at the Third Street interchange. Thus, at this time a continuous section of freeway is in service for a total length of five miles in San Francisco from Third Street and Bayshore to the perimeter of the central district.

Urgently Needed Link

The most urgently needed link on the Bayshore Highway is the ultimate bypass of the congested area through Visitacion Valley in San Francisco and through Brisbane, between Third Street and Sierra Point. On the north end of this section, work was started on a contract in May, 1954, which was awarded to Edward Keeble for grading and structures between Third Street and Candlestick Point. This $700,000 project is 0.7 mile long.

Continuing southward from Candlestick Point the freeway alignment traverses open water of an arm of San Francisco Bay. Work was previously completed on two contracts for filling experimental sections of embankment on the bay mud. The first job extended 0.3 mile southward from Candlestick Point and the

LEFT—View of construction operations for closing of 3.6-mile gap in Boyshore Freeway. Candlestick Point in foreground, looking south ocross open water toword Sierra Point. RIGHT—Fill operation for Boyshore Freewoy midway between Candlestick Point and Sierra Point. Wedge-shaped form is used during end-dumping operation to maintain outward flow of mud. This view, which shows shape of mud wave, was taken during low tide.

LEFT—View of Bayshore Freeway during final stages of construction looking north from vicinity of Hillsdale Boulevard interchange in San Mateo. RIGHT—View of Rolston Avenue interchange on Bayshore Freeway in Belmont near completion of construction.

second unit. 0.4 mile long, was located farther out in the bay where the mud depth was greater. Another step was taken when bids were opened March 16, 1955, for a $400,000 project to fill the gap between the two experimental units.

Over Water Fill

The work of constructing this fill is an interesting undertaking. The mud which reaches a maximum depth of 70 feet is highly fluid in its natural state. It has been determined that a dry fill could be constructed so as to reach a fairly stable condition through displacement of the mud by the weight of the fill material. This operation results in a mud wave extending ahead some 600 feet to 800 feet. As it was found that this mud has a tendency to set up when it remains undisturbed for a short period once initial displacement has occurred, a placing plan has been followed which concentrates the end-dumping of material on a small area at the forward end of the fill as long as subsidence continues at an appreciable rate. Also, the fill is pushed forward in the form of a pointed nose to maintain an outward flow in the mud wave. Whenever there is cessation of operations for more than 24 hours, such as over a weekend, charges of dynamite are jetted into the mud in advance of the fill and are set off to start the movement of the mud again as further weight is applied.

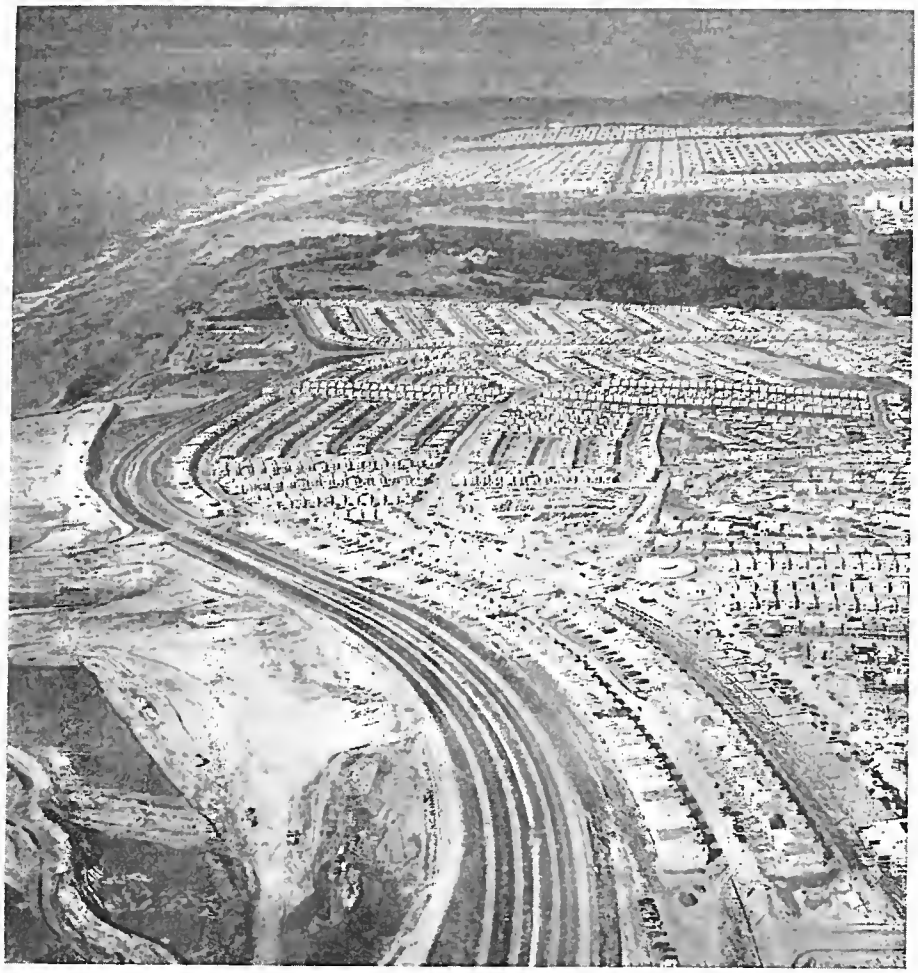
In this manner. work is progressing on a double shift basis on a $1,500,000 contract held by Guy F. Atkinson Company for continuing the fill southward through the central portion of the open water link. Continued progress is assured through funds which have been included in the 1955-56 budget in the amount of $3,200,000 to finance the final fill operation and building of structures on this section. Still another contract for paving of this 3.6-mile link will be required before a continuous freeway on the Bayshore from San Francisco to San Mateo County becomes a reality.

In San Mateo County

Continuing southward in San Mateo County, finishing touches are being applied to a five-mile contract by Piombo Construction Company on the Bayshore Freeway between Sixteenth Avenue in San Mateo and San Carlos. This $4,100,000 project is already serving traffic and has increased the continuous length of the facility already in use on the peninsula to 16.2 miles.

Thus, when the construction across the open water is completed, which is expected in 1957, a total length of 25 miles of freeway will be in operation from downtown San Francisco to San Carlos.

Further progress on this route is indicated through the opening of bids on April 6, 1955, for an 0.8-mile unit in the vicinity of Menlo Park, which includes an interchange at Willow Road. This intersection is presently the scene of maximum congestion on the remaining portion of the original Bayshore Highway between the San



Expressway impravement on Skyline Baulevard thraugh area which is being rapidly develaped in the nartherly portion of San Mateo County

Carlos terminus of the freeway and San Jose.

In the San Jose area plans have been completed for a 1.6-mile section of the Bayshore Freeway from Santa Clara Street to Rosa Street. It is expected that the right of way will be cleared soon to permit early advertising for bids on this unit. Financing is provided through $1,600,000 in the 1955-56 Fiscal Year construction program.

CENTRAL FREEWAY

The start of a new freeway route was made available to San Franciscans through the opening of the initial unit of the Central Freeway on March 1, 1955. This freeway is shown on the city trafficways plan as extending from the Division Street Interchange on the Bayshore Freeway to the approach leading to the Golden Gate Bridge at a location near Lombard Street and Van Ness Avenue.

The completed section which is 0.8 mile in length, follows Thirteenth Street to a terminal ramp at Mission Street. The steel structure which supports the freeway, resembles the previously completed portion of the skyway and makes provision for local traffic at ground level beneath the facility.

Viaduct structures which form a wye at Division Street to permit direct interchange of traffic in three directions at Division Street, were finished at the same time as the Thirteenth Street lateral. The work on the wye connections and the main freeway unit was done by Charles L. Harney, Inc., under three contracts at a total construction cost of $4,500,000.

On April 1, 1954, a further step was taken when the California Highway Commission adopted the route for another section of this freeway which extends northerly to Turk Street. Plans are being prepared for this extension of the Central Freeway and the tempo of right of way acquisition will be stepped up by virtue of an allocation of $5,100,000 in the 1955-56 Fiscal Year program for this purpose.

EMBARCADERO FREEWAY

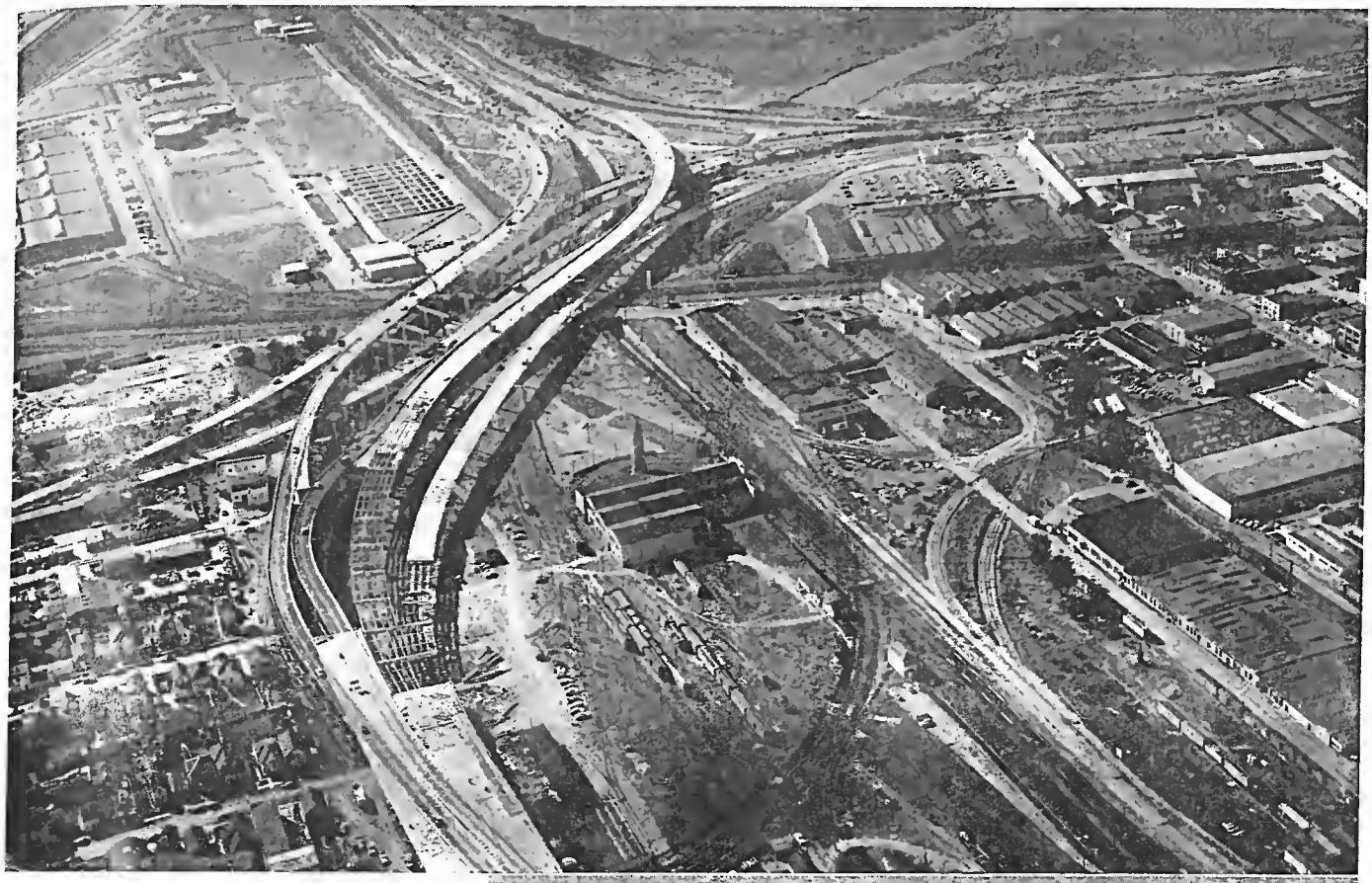
On March 2, 1955, MacDonald, Young & Nelson and Morrison Knudsen Company, Inc., submitted a low bid of $5,200,000 for building the first unit of the Embarcadero Freeway in San Francisco. This project will continue the skyway easterly from the point where the Bayshore Freeway connects with the San Francisco-Oakland Bay Bridge approach at Fourth Street to on and off ramps which connect with Mission Street at Beale Street and Main Street, respectively. The design for this project utilizes a two-level type of viaduct which separates opposing traffic vertically in order to keep the right of way needs to a minimum.

The 1955-56 Fiscal Year budget also provides financing in the amount of $2,600,000 for a second unit of the viaduct which will extend to the Embarcadero. Meanwhile, work is progressing on plans and negotiations are under way for the acquisition of right of way for the continuation of this artery northerly along the Embarcadero to Broadway.

SOUTHERN AND WESTERN FREEWAYS

With the approaching completion of final work on the Bayshore and the progress which has been made on the portions of the Embarcadero and Central Freeways, for which the routing has been determined, attention is now being directed to other segments of an integrated freeway system in San Francisco.

Two additional routes merit a high priority as projects which will facilitate the movement of large volumes of traffic within the city. These have been designated as the Southern and Western Freeways. The first of these routes starts at the county line in the



UPPER—Construction operations on additions to the distribution structure looking westerly toward the approach to the San Francisco-Oakland Bay Bridge. The dual two-lane roadways in the lower left of the picture are detours which have been constructed on temporary timber trestles. LOWER—View of construction operations on East Bay Distribution Structure looking east toward MacArthur Boulevard.

vicinity of Junipero Serra Boulevard and traverses the southerly portion of the city to a junction with the Bayshore Freeway at Alemany Boulevard.

The general route for the Western Freeway under study starts at the same location at the county line and traverses the western portion of the city in the area to the south of the Golden Gate Park and thence runs easterly to a junction with the proposed Central Freeway in the vicinity of Oak Street.

While both of these routes follow the general location of a combination of freeway facilities which have been delineated on the San Francisco Trafficways Plan, a number of alternate locations in these general areas will be reviewed during the study. The city

LEFT—View of the first completed unit of the Eastshore Freeway ta the north af the distribution structure; Powell Street interchange in center; Ashby Avenue interchange beyond. RIGHT—View af construction operotions for north section of Eastshare Freeway looking north from site of the University Avenue interchange taward the El Cerrita Overhead.

is also taking steps to implement the work which is being performed by the Division of Highways and their present studies include a proposal for a continuation of the Southern Freeway from the Bayshore Freeway to a junction with the proposed Southern Crossing.

EASTSHORE FREEWAY

Much activity has taken place in the metropolitan Bay area on the Eastshore Freeway during the past year. In September, 1954, Fredrickson & Watson Construction Company and M & K Corporation started work on a $1,700,000 contract on this route. Extending from Market Street between Fifth and Sixth Streets to Eleventh and Cypress Streets, this 0.7-mile project will provide an elevated facility which should be ready to carry traffic this September.

On the intervening 1.4 miles between this construction and the distribution structure, bids will soon be received for the continuation of the improvement. On this particular section the freeway is to be carried on a double-deck viaduct in a manner similar to the plan which has been developed for the Embarcadero Freeway in San Francisco. A budget allocation of $7,015,000 to finance the work is the largest amount that has ever been earmarked for a single highway contract in the Bay area.

Next in sequence on this route is the $4,500,000 contract with MacDonald, Young & Nelson, Inc., and Morrison Knudsen Company, Inc., for the expansion of the distribution structure. Three additional ramps are being provided in conjunction with the modification of portions of the existing structure.

The original structure was an early example of a direct type of interchange that served traffic well until a fourfold increase to a volume of about 120,000 vehicles per day occurred. The improvements now under way which are expected to be finished in October, will allow for doubling of present traffic without congestion. The expanded structure is laid out on three levels which results in the elimination of cross weaving traffic movements.

Congestion Eliminated

Continuing north from the distribution structure a 1.5-mile section of the Eastshore Freeway was completed in November, 1954, by Peter Kiewit Sons' Company at a cost of $2,800,000. This project eliminated the congestion which resulted from the first of a series of signalized intersections on the Eastshore Highway through an interchange which was provided at Powell Street.

From Ashby Avenue northerly to the El Cerrito Overhead work has been under way on a $4,800,000 contract, also held by Peter Kiewit Sons' Company for the continued conversion of the northern section of the Eastshore Highway to an eight-lane freeway. This contract which is scheduled for completion in August covers grading for the full three-mile

Construction scene on Eostshore Freeway project in Ookland from Morket to 10th Street where route turns into Cypress Street and runs north. The 1.4-mile section olong Cypress from this project to the distribution structure is scheduled to be started this year as o twa-level viaduct at an estimated cost of $7,015,000.

LEFT—Construction operations on Route 228 connection between the Eastshore Freeway at San Lorenzo and Castro Valley. RIGHT—Looking east along location of Route 228 connection from Washington Avenue interchange on Eastshore Freeway to the recently completed Castro Valley Bypass which appears in the distance.

length, paving between Ashby Avenue and University Avenue, and construction of the Ashby Avenue Interchange.

This interchange is now in use and as a result the second in the series of signalized intersections is now carrying heavy volumes of traffic without interruption. The scheduled completion date for the remaining work on this project is August, 1955.

On January 3, 1955, work was started on a $2,250,000 contract awarded to Stolte, Inc. & Gallagher & Burk, Inc., for the balance of the paving and structures between University Avenue and the El Cerrito Overhead. The operations on this 1.6-mile project are expected to be completed in October, 1956.

On the southerly section of the Eastshore Freeway a noteworthy addition to the Bay area freeway system was made on July 2, 1954, when a 9.3-mile portion from Warm Springs to San Jose was opened. Constructed to full freeway standards, this facility includes traffic interchanges at important intersections and affords a much needed measure of relief to traffic on Highway 17 between San Jose and Oakland. The work was accomplished in two contracts, one held by the Fredrickson & Watson Construction Company and M & K Corporation, and the other by the Granite Construction Company, at a total cost of $4,000,000.

At the present time a 14-mile gap exists on this route between Warm Springs and the southern end of the previously constructed freeway units between Oakland and Hayward. Progress toward the final elimination of this gap is seen, however, as $4,500,000 has been included in the 1955-56 Fiscal Year budget for a 5.6-mile southward extension to Beard Road.

It is expected that bids will be received for construction of this project late this summer. Meanwhile, work is going forward on plans and acquisition of rights of way for the section which will culminate in the final closing of the gap. When this is accomplished a total length of 38.0 miles of modern facility will be providing traffic service between San Jose and Oakland and the Eastshore Freeway-south will be completed except for a short stretch within the City of Oakland.

US 50

A 1.5-mile freeway bypass through Castro Valley on Route US 50 was opened to traffic on September 14, 1954. The work was performed by Fredrickson Brothers under a $1,270,000 contract.

Continuing westerly from the completed unit, work has been under way since June, 1954, on a 2.9-mile section of full freeway that will tie into the Eastshore Freeway at San Lorenzo. The construction which is being performed on this $2,900,000 contract by Ball & Simpson, Erickson, Phillips & Weisberg, is expected to be completed next December.

To the east of the Castro Valley bypass plans have been completed for the improvement of a final 5.3-mile section of the original route between

Castro Valley and the San Joaquin Valley which remains to be improved to modern standards. As the 1955-56 budget includes an item of $4,680,000 for this final link, it is expected that work will be under way on a contract at this location this summer.

At the easterly boundary of Alameda County a District X project which extended from Tracy to the Altamont Pass included a 1.7-mile section in Alameda County. The completion of work on this expressway marked an important step forward in providing an adequate highway facility from the San Joaquin Valley to the Bay area. The completion of two projects, one currently under construction and one which has been budgeted, will result in a continuous freeway or expressway ride from Tracy to Oakland, a distance of 51 miles via US 50 and the Eastshore.

The heavy traffic on the metropolitan terminus of this route emphasizes the need for the completion on a direct alignment to the Bay Bridge approach in Oakland. Such a measure would not only relieve the load caused by through traffic on this route which is presently using the Eastshore Freeway between San Lorenzo and Oakland, but would also furnish a vital traffic service to local users. To accomplish this a step was made on January 26, 1955, when the California Highway Commission adopted a route for a portion of a freeway along MacArthur Boulevard between the distribution structure and Park Boulevard in Oakland.

Following the commission action work has been pressed on the plans for this freeway unit and funds have been made available to commence the acquisition of necessary rights of way.

Expressway on US 50 at crossing of the Delta Mendota Canal near the Alameda-San Joaquin County line. New construction joins with the original four-lane divided facility through the Altamont Pass in the distance where the ramps of an interchange are discernible.

Meanwhile, studies are also under way which will lead to the determination of the remaining section through Oakland, together with its easterly extension to Castro Valley.

MOUNTAIN BOULEVARD

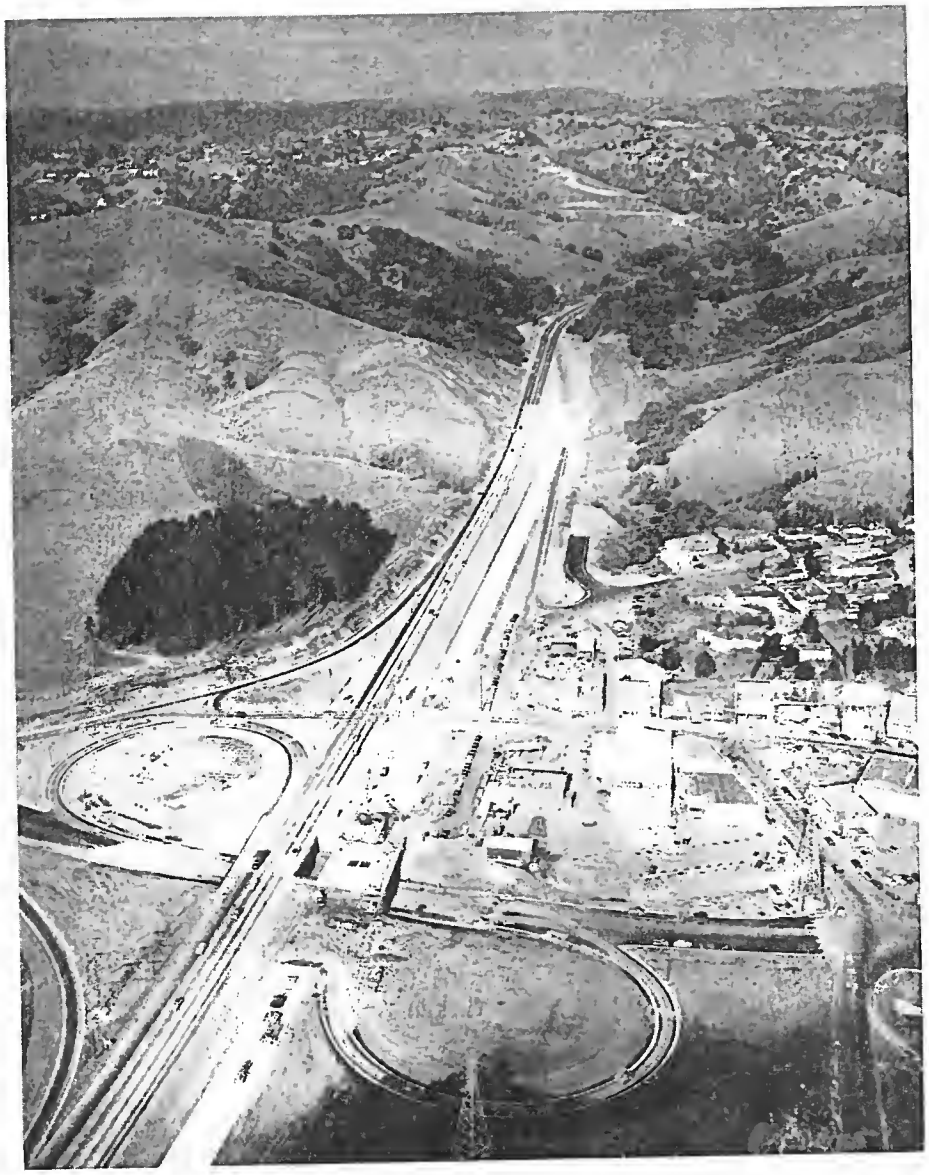
The improvement of Mountain Boulevard in the City of Oakland to freeway standards was originally undertaken by Joint Highway District No. 26. Work on a 1.1-mile section near Lake Temescal was previously completed under the direction of the joint highway district. At the request of Alameda and Contra Costa as member counties, together with the City of Oakland, the State agreed to the dissolution of the joint highway district on July 1, 1954, in a measure which was taken in an effort to speed up the development of this route. The action was taken with the understanding that Alameda County and Oakland would continue to contribute toward the financing of the future projects.

On March 30, 1955, bids were opened for a one-mile project between Thornhill Drive and Ascot Drive with an estimated cost of $1,200,000. It is also expected that bids will soon be received for a $150,000 separation structure at Lincoln Avenue on this route.

US 40—RICHMOND TO CARQUINEZ

Construction of this freeway was started at the Richmond end by the award of a contract to MacDonald, Young & Nelson, Inc., for two structures, one over the Santa Fe tracks at 47th Street and one over San Pablo Creek. This work was completed in November, 1954, at a cost of $380,000. Work on the principal contract was started in November, 1954, when Fredrickson & Watson Construction Company started operations on a $5,400,000 contract which will complete the initial 4.8-mile unit in July, 1956.

Meanwhile work is continuing on the plans and acquisition of right of way for remaining sections of this route northerly to the Carquinez Bridge and southerly to the Albany Overhead in Alameda County where the work previously described as part of the Eastshore Freeway commences.



View of final stage of construction of the Orinda interchange

OAKLAND-WALNUT CREEK AND CONCORD-DANVILLE

The congestion on Highway 24 to the east of the Broadway Low Level Tunnel has been at record level for the past few years due to the accelerated development which has occurred in the westerly portion of Contra Costa County. The first material progress toward alleviating this condition was realized on March 10, 1955, when a 1.2-mile section of freeway, including an interchange at Orinda Crossroads was fully opened to traffic.

The work was performed by Fredrickson & Watson Construction Company and M & K Corporation, at a cost of $1,500,000.

Bids were opened on March 30, 1955, for a similar type of project which will provide an interchange at the Pleasant Hills Road intersection. The estimated cost of this 1.3-mile undertaking is also $1,500,000.

Additional work which has been included in the 1955-56 Fiscal Year program includes a 2.8-mile freeway bypass of Lafayette which is immediately west of the Pleasant Hills Road Interchange project and another section, also 2.8 miles in length, extending northerly from Walnut Creek to Monument. The budget allocations for these projects are $3,800,000 and $3,580,000 respectively, and it is anticipated that right of way will be cleared to permit receiving bids for both of these projects early this summer.

Further progress in the improvement of highway transportation in this area occurred on January 26, 1955, when the California Highway Commission adopted a route for the further extension of the freeway system from a wye in Walnut Creek in a southerly direction to a point one mile south of Danville. Meanwhile, improvement of another portion of the Danville Highway is foreseen as bids were opened on March 23, 1955, for improvement of a 2.1-mile section extending northerly from Dublin to a point near the Alameda-Contra Costa county line.

While an interchange will be provided through a separation which is to be built at the Dublin intersection with US 50, a plan is being followed that has been used on other recent construction in rural areas. The initial two lanes of a future divided facility will be constructed on this project and sufficient right of way together with access control has been acquired in order that the improvement may later be developed into a full freeway when traffic conditions and availability of further funds warrant such action.

ARNOLD INDUSTRIAL FREEWAY

With the previous improvement of the portion of the Arnold Industrial Highway in Contra Costa County as a partial freeway through the congested area between Willow Pass and Antioch, work on this thoroughfare was limited to a single project during the past year.

The conflict of traffic at the intersection at grade which was originally provided at Loveridge Road reached a magnitude which warranted a higher standard of development. Under a cooperative agreement with the county, an agreement was made calling for the State to pay for the cost of a separation structure and Contra Costa County to pay for the connecting ramps, which actually constituted the major portion of the project.

A contract was subsequently let to Gallagher & Burk, Inc., at a cost of

$280,000 in March, 1954, for the construction of an interchange at this location and the improvement was opened to traffic on April 1, 1955.

Thus, while a limited freeway does not provide the same measure of safety and convenience which is obtained from the full development, the work which has been done at the Loveridge Road intersection is an example of what may be accomplished in the future at other locations on expressways.

SKYLINE BOULEVARD

With the development of the residential areas in San Mateo County extending easterly from the coast and westerly from the peninsula to a point where the subdivisions are converging upon the ridge along which Skyline Boulevard is located, emphasis has been placed upon the need for an improved facility to serve as an additional major connection with San Francisco.

December, 1954, marked the completion of the first project which provided a 2.3-mile section of expressway from Edgemar Road at Alemany Boulevard, at a cost of $1,000,000.

To the north of the completed section plans have been completed and bids will soon be received for two additional units which will extend the improvement to Lake Merced Boulevard in San Francisco at an additional expenditure of approximately $1,000,000.

LOS GATOS-SANTA CRUZ

To keep pace with the traffic needs beyond the immediate metropolitan area, emphasis has been placed on freeway bypasses designed to relieve congestion which accompanies locations through residential and commercial districts. Such a situation is being met in the town of Los Gatos through the construction of a 2.4-mile bypass.

Work will soon be finished on structures for the future freeway under a $370,000 contract with Carl N. Swensen Company.

Meanwhile, operations are now under way on a second contract which was awarded to L. C. Smith for the balance of the roadwork on this project. It is expected that work, which will cost $1,300,000, will be completed in November.

In Santa Cruz action also has been taken to relieve the congestion which has resulted from the routing of highway traffic over city streets. Here, a $1,270,000 project which will extend from the north city limits of Santa Cruz on the Santa Cruz-Los Gatos highway to Mission Street, is scheduled to be ready for the advertising of bids by mid-year.

US 101—GOLDEN GATE BRIDGE TO SANTA ROSA

The past year has witnessed a number of important steps toward achieving a continuous freeway be-

LEFT—Construction operations on Golden Gate Bridge Freeway immediately north of the bridge. New lanes will lead to portal of twin bore of Waldo Tunnel which appears to right of existing tunnel portal. RIGHT—Construction operations for Golden Gate Freeway.

Construction operations on foundations for new bridge across Richardson Bay in Marin County. When the new six-lane divided facility is completed the existing timber bridge which has reached the end of its useful life will be removed.

tween the Golden Gate Bridge and Santa Rosa. The Waldo approach which has recently been appropriately designated as the Golden Gate Bridge Freeway, has been the scene of two major contracts.

The Guy F. Atkinson Company is finishing their work on a $4,500,000 contract which covered grading, construction of a twin bore opposite the Waldo Tunnel and structures on a 4.0-mile section of this route. Work has also been started on the second job, a $1,300,000 contract with A. G. Raisch Company, for completing the construction and paving of this unit. The work on this final contract is scheduled to be finished in December. The Golden Gate Bridge and Highway District contributed $5,000,000 toward the cost of this project.

One mile north of the Waldo approach, the building of a new bridge across Richardson Bay is well under way. The contract for this $3,200,000 structure is held by Duncansen, Harrelson & Pacific Bridge Company, and work is scheduled for completion in October, 1956. Meanwhile, funds have been budgeted in the 1955-56 Fiscal Year to fill in the gap between the Waldo approach and the new Richardson Bay Bridge, as well as to extend the freeway to a point 0.3 mile north of the Alto intersection. Bids have been requested for this 1.5-mile unit for which $1,730,000 has been allocated.

Greenbrae Intersection

Several miles to the north a measure of relief will be provided at the Greenbrae intersection. This will be in the form of construction which is proposed from a $1,000,000 allocation in the same budget to finance a portion of the Greenbrae interchange. The initial work which will serve as an interim development will separate southbound traffic and thus remove the most serious bottleneck on US 101 in Marin County and at the same time provide substantial relief for northbound traffic. The balance of the work required to complete this interchange, together with the adjacent sections of the freeway including an interchange at the Corte Madera intersection, will follow at a later date.

Another step in the over-all program to provide an integrated modern highway transportation network, occurred on June 17, 1953, when the California Highway Commission adopted the routing for a freeway connection between the San Quentin wye just south of San Rafael and the westerly end of the Richmond-San Rafael Bridge. Plans are being prepared for this 2.2-mile link so as to permit scheduling of the improvement to coincide with the completion of the bridge. The initial facilities will be required in October, 1956, when it is expected that the first deck of the bridge will be finished. The planning includes the necessary consideration for the expansion of these facilities at such time as the second deck of the structure is placed into service.

Petaluma Bypass

Strides are also being made in the area from Petaluma to Santa Rosa to overcome the congestion on the existing route through the heart of the business district in Petaluma, and upon the present two-lane highway extending northerly to Santa Rosa.

Two current contracts cover work which is in progress on the Petaluma Bypass. The first one to be let covered two sets of twin structures which are being built across the navigable channel of Petaluma Creek and over the tracks of the Northwestern Pacific

Railroad. This construction, done at a cost of $900,000, is practically completed, and was performed by Erickson, Phillips and Weisberg.

The second contract, held by Parrish Brothers and Carl N. Swenson Company, extends northerly 8.6 miles from a point one mile south of Petaluma Creek. This job covers grading for the entire length and paving and structures on the southerly five-mile portion which will constitute the Petaluma Bypass. The operations are scheduled for completion in June, 1956, at a cost of $3,700,000.

On March 16, 1955, bids were opened for a northward extension of this freeway to Wilfred Crossing. This project, which is estimated to cost $2,800,000, includes paving of a three-mile graded section of the preceding contract and will result in a freeway unit 7.9 miles in length when finished.

Plans are nearing completion and right of way is being acquired for the remaining section between Wilfred Crossing and Santa Rosa, a distance of 5.0 miles.

NAPA AREA

Representative of a project which has been designed to replace a section of substandard alignment in a rural area, is the work under way on a 2.7-mile section on Sign Route 37 in Napa County. The work extends easterly from a point two miles east of the Sonoma-Napa County line and the current operations cover the construction of the initial two lanes of a future four-lane freeway facility for which the right of way and access control have already been provided. The $410,000 contract with Arthur B. Siri, Inc., will be completed later this summer.

Route of the freeway bypass of Petaluma where operations are under way on two contracts for the structures and roadwork for the new facility

A further improvement of this nature is also projected at another location in Napa County. On August 25, 1954, the California Highway Commission adopted a freeway routing for a five-mile section of the St. Helena Highway, extending from the north end of the Napa Bypass to one mile south of Yountville. While the initial construction has not yet been programmed, funds have been included in the current budget to commence the acquisition of rights of way.

Plans are completed and right of way is being acquired for the construction of an expressway between four miles north of St. Helena and Calistoga, a length of 3.7 miles. An initial two-lane facility with right of way for ultimate four lanes is proposed.

SERVING HEAVY URBAN TRAFFIC DURING CONSTRUCTION

Most of the major freeway projects in this area have been developed along the locations of the existing highway routes as economics have dictated the incorporation of some of the original improvements and right of way as a part of the new facility. This condition has posed many problems of a complex nature in the planning and construction of the individual projects.

As the freeways which have been started or completed thus far were of high priority because of traffic congestion, it was considered essential that traffic should be subjected to a minimum of inconvenience during the construction period. In this regard the actual goal has been to make provisions for the conduct of traffic through the work on a par with the service offered by the original facility. In many cases this meant construction of multilane, paved detours conforming to geometric standards acceptable for prevailing speeds. In some cases portions of ramps and frontage roads were developed on an expanded basis to serve this purpose.

No doubt the greatest challenge to our design and construction engineers has occurred on the current contract for the modification of the East Bay Distribution Structure. Here, an existing facility which in its original form

was a complex direct type of interchange carrying 120,000 vehicles per day, is being expanded to more than twice its initial size. The new construction is closely interwoven under, over and alongside the present ramps.

It has also been necessary to remove portions of the structure where connections are being made to the new facilities. This has been accomplished in part by the construction of two sections of a trestle type detour alongside portions of the ramps. Except for a relatively few occasions when it was necessary to erect steelwork over traveled roadways, and a small number of vehicles was required to follow a detour routing during early morning hours, the bulk of the traffic has continued to use the facility without inconvenience from the work.

RIGHT-OF-WAY ACQUISITION

Perhaps the most important and certainly the most remunerative single step in economical use of highway funds was the creation of a revolving fund for the advance acquisition of rights of way. The California Legislature in 1952 made available to the Highway Commission, the sum of $10,000,000 as an advance fund to be used for the purchase of rights of way where pending expensive development patently conflicted with proposed freeway routes, and where construction could not be financed for several years. In 1953 the fund was increased to $30,000,000 permitting full operation of this program of prior purchase.

Funds in the amount of approximately 5 million dollars have been authorized in this district and of this total, about 3 million has been obligated. Time and effort required in the acquisition of real property is a matter of common knowledge. To reap the potential savings in the advance acquisition plan has required constant vigilance, however, the results have justified the intensity of the effort. In addition to preventing development on land required for future projects which would later be removed to the inconvenience and possible intangible loss to investors, properties now purchased under the advance acquisition plan for $19,000,000 would otherwise cost the State an amount estimated at $114,000,000.

CONCLUSION

The expeditious, convenient and safe movement of traffic has been a primary objective in this program of modernizing highway transportation. Elimination of grade crossings, reduction of side friction due to multiple access, high standards of grade and alignment, wide traffic lanes, and improved signing, have, among numerous other features, produced facilities which encourage rapid and convenient transportation through maintained speeds over long distances. What, then, is the story of safety?

Unfortunately, safety cannot be effectively discussed without reference to accidents; the lack thereof, being the direct result of the degree of safety which the facility offers. The period of observation has been sufficiently long to permit reliable appraisal, particularly with respect to accidents involving fatalities. While accidents involving property damage or minor injury are of great consequence, the heavy toll of fatal accidents in itself, stresses the need for effective action.

It is customary to refer to fatality statistics in terms of 100,000,000 vehicle

... Continued on page 21

STATUS OF DISTRICT IV FREEWAY PROJECTS

March, 1955

	Total miles	Completed projects		Under contract		Budgeted		Right-of-way cost
		Miles	Construction cost	Miles	Construction cost	Miles	Construction cost	
Bayshore Freeway; Bay Bridge to San Jose	48.8	15.1	$23,126,000	9.1	$14,394,000	5.9	$5,850,000	$30,159,000
Central Freeway; Bayshore to Turk Street	1.9			0.8	3,649,000			1,865,000
Eastshore Freeway; Richmond to San Jose	55.7	26.1	26,583,000	5.7	14,785,000	7.0	11,515,000	21,767,000
U. S. 101; Golden Gate Bridge to Santa Rosa	51.1	26.0	5,298,000	13.6	13,578,000	7.1	5,530,000	16,867,000
Black Point Cutoff; Ignacio to Sears Point	7.3	0.7	1,004,000					222,000
Napa Area; Solano County Line to Union Station	31.1	14.6	1,441,000					712,000
U. S. 40; Richmond to Carquinez Bridge	13.8		388,000	4.8	5,441,000			4,120,000
Arnold Industrial Freeway; Hercules to Bridgehead Ave.	53.2	13.8	4,400,000		285,000			1,358,000
Oakland to Arnold Industrial Freeway near Ohmer	19.4	2.3	226,000	1.2	1,579,000	6.7	8,880,000	2,700,000
Mountain Blvd; Tunnel Freeway near Lake Temescal to San Leandro	9.3	1.1	1,297,000			1.0	1,350,000	540,000
Altamont Pass; San Lorenzo to San Joaquin County Line	33.9	26.4	7,094,000	2.9	2,900,000	5.3	4,680,000	7,341,000
Pacheco Pass; 1 Mile east of Bell's Station to Merced County Line	5.3	5.3	1,285,000					20,000
El Camino Real; San Jose to San Benito County Line, portions	14.4	14.4	2,856,000					1,269,000
Santa Cruz to Watsonville	15.3	7.7	2,740,000			1.3	1,270,000	1,779,000
San Jose to Santa Cruz	21.1	1.8	1,337,000	2.4	1,699,000			2,577,000
Skyline Boulevard; San Francisco County Line to Edgemar Road	3.4	2.2	640,000			0.9	348,000	1,073,000
Embarcadero Freeway; Bay Bridge to Broadway	1.5					1.2	8,000,000	9,950,000
Park-Presidio Freeway; Golden Gate Bridge to Fulton Street	2.0	1.1	1,172,000	0.5	454,000			50,000
Totals	388.5	158.6	$80,887,000	41.0	$58,764,000	36.4	$47,423,000	$104,369,000

TRANSPORTATION SECTION OF THE MASTER PLAN OF SAN FRANCISCO

TRAFFICWAYS PLAN

FREEWAY

MAJOR THOROUGHFARE

SECONDARY THOROUGHFARE

EXPRESSWAY TREATMENT

PARKWAY TREATMENT

THIS PLAN WAS ADOPTED BY RESOLUTION NUMBER 394B ON JULY 17, 1951, AND AMENDED BY RESOLUTION NUMBER 4423 OF THE CITY PLANNING COMMISSION AT A REGULAR MEETING HELD ON MAY 19, 1955.

RECOMMENDED
Paul Oppermann
DIRECTOR OF PLANNING

APPROVED
Ernest E. Kelling
PRESIDENT

CERTIFIED
SECRETARY

TRANSPORTATION

1

PLATE

SAN FRANCISCO DEPARTMENT OF CITY PLANNING

Skyways

Multimillion-dollar Section Of Bayshore Freeway Opened

San Francisco on June 14th officially celebrated the completion of the final link in $23,000,000 worth of skyway approaches to the San Francisco-Oakland Bay Bridge.

Ribbon cutting ceremonies were presided over by Thomas J. Mellon, President of the San Francisco Chamber of Commerce, which sponsored the opening of the new freeway. Mellon, after reading a message from Governor Goodwin J. Knight, introduced the following speakers: Thomas A. Maloney, Speaker pro Tempore of the State Assembly; George J. Christopher, President of the San Francisco Board of Supervisors; Frank B. Durkee, Director of Public Works; Thomas A. Brooks, Chief Administrative Officer of San Francisco; R. M. Gillis, Deputy State Highway Engineer; B. W. Booker, Assistant State Highway Engineer, under whose direction the new freeway approaches were constructed; C. M. Corbit, Regional Engineer of American Institute of Steel Construction and F. W. Panhorst, Assistant State Highway Engineer, who is chief of the Bridge Department of the Division of Highways.

B. W. BOOKER
Builder of Skyways

On behalf of the American Institute of Steel Construction, Corbit presented to Panhorst a plaque awarded for beauty of design of the overhead freeway. Wendell Pond, Senior Bridge Engineer of the Division of Highways, designed the structure.

Following the speech making, Public Works Director Durkee took care of the ribbon cutting which signalized the opening of the new freeway to traffic.

Coincident with this ceremony, final stages of work on a five-mile section of Bayshore Freeway from Sixteenth Avenue in San Mateo to San Carlos were completed.

This six-lane freeway project was constructed at a cost of $5,859,778, including right of way acquisition, provides interchanges at Nineteenth Avenue and Hillsdale Boulevard in San Mateo, Ralston Avenue in Belmont and Holly Street in San Carlos.

While the completed project provides six freeway lanes initially, the facility has been constructed with a wide median which will accommodate an additional lane in each direction when conditions warrant the expansion.

The opening of this five-mile stretch results in a total length of 16.4 miles of continuous freeway now in operation along the Bayshore route in San Mateo County.

Completion of Downtown Section

The opening of the connection for eastbound traffic from the San Fran-

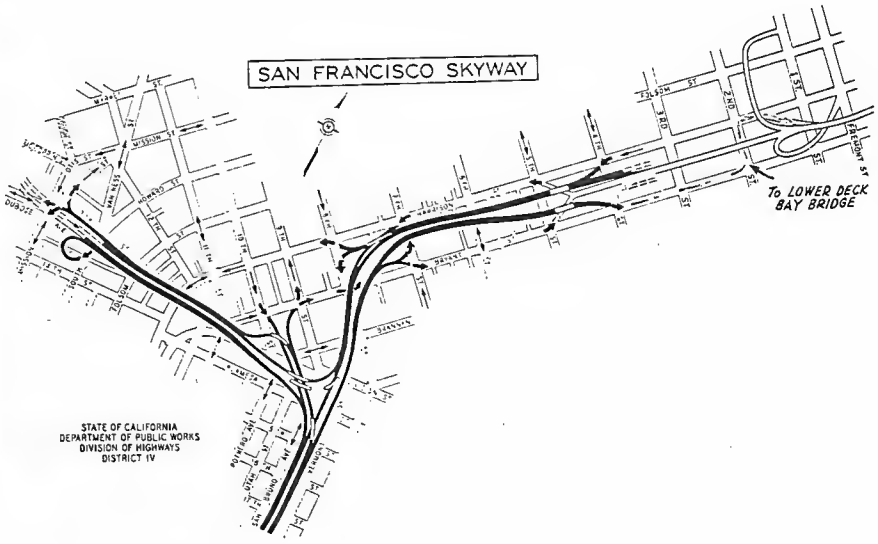
THOMAS A. BROOKS

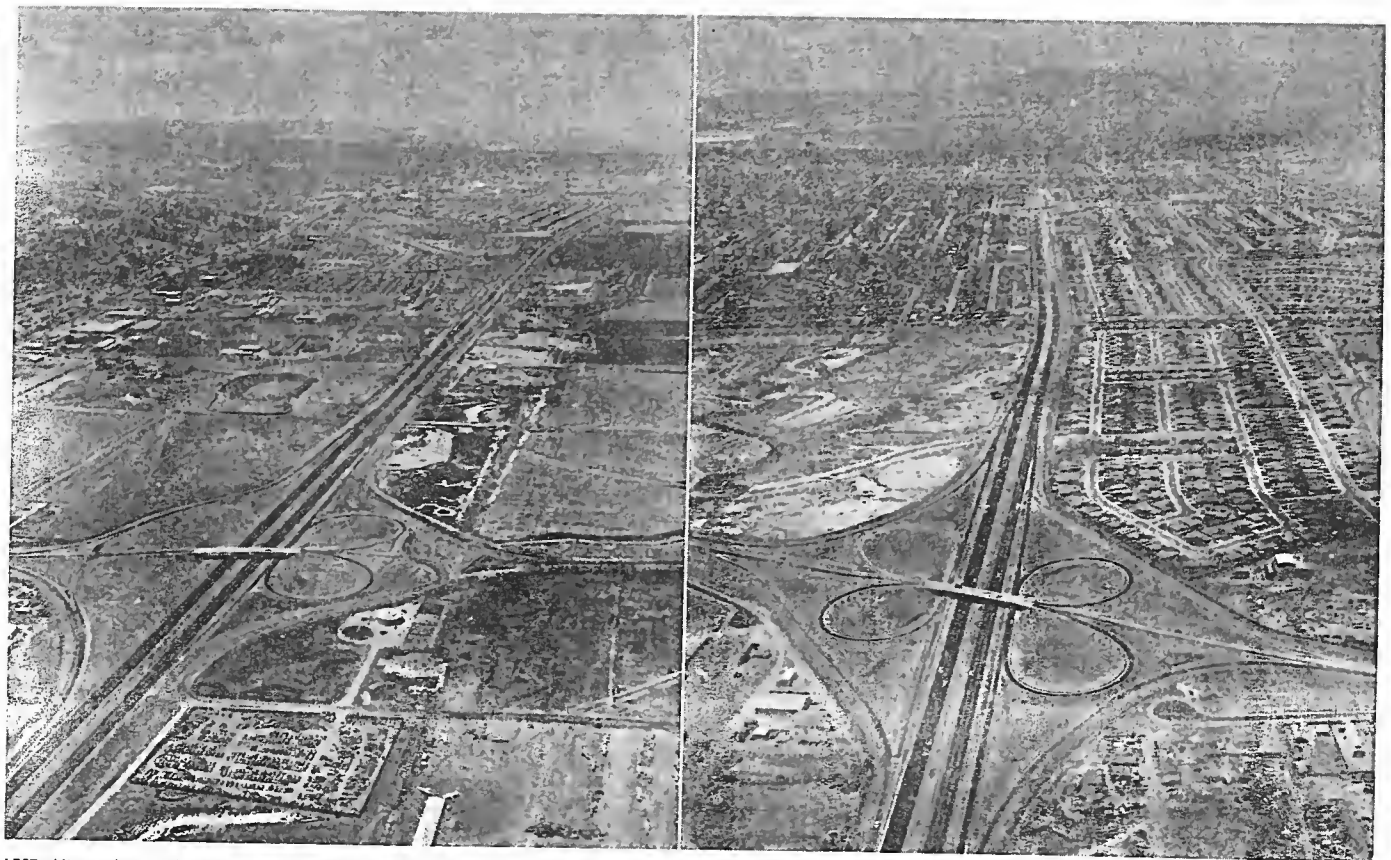
ASSEMBLYMAN THOMAS A. MALONEY

SUPERVISOR GEORGE J. CHRISTOPHER

Surraunded by four cantestants far the title af Miss San Francisca, Directar af Public Warks Fronk B. Durkee snips ribbon. Officials, left ta right, are: C. A. Maghetti, Secretary, Califarnia Highway Cammissian; Geargе J. Christapher, President, San Francisca Baard af Supervisors; Highway Commissianer F. Walter Sandelin; Durkee; Thamas J. Mellan, President, San Francisco Chamber af Commerce; Assemblyman Thomas A. Maloney.

DEPUTY STATE HIGHWAY ENGINEER
R. M. GILLIS





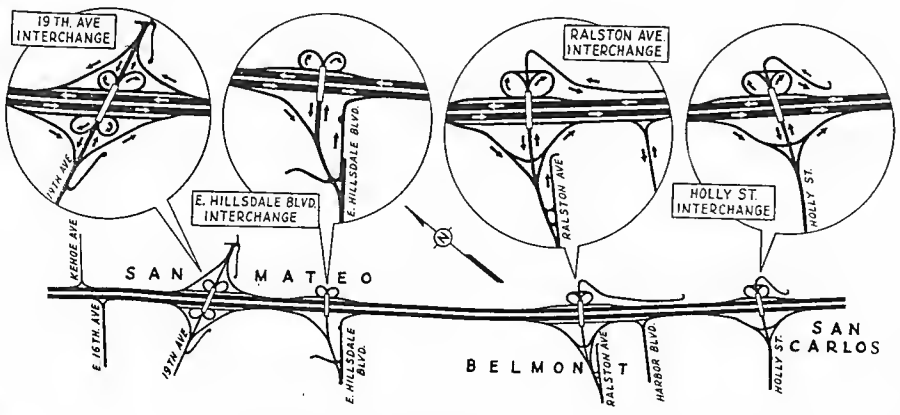
LEFT—View of recently completed five-mile section of Bayshore Freeway between San Mateo and San Carlos. Holly Street Interchange at San Carlos in foreground.
RIGHT—View of recently completed section of Bayshore Freeway in San Mateo. Tenth Avenue Interchange in foreground.

cisco Skyway to the Bay Bridge on June 14th marked the completion of the downtown end of the Bayshore Freeway. The eastbound connection from the Central Freeway and the on-ramp at Eighth Street and Bryant Street were opened at the same time.

Work on the Bayshore Freeway from Alemany Boulevard to Army Street was started in June, 1949. This one-mile section was completed in June, 1951. The northerly continuation of the original section which extended the facility to ramps connecting with Bryant Street at Ninth and Tenth Streets was opened to traffic in October, 1953. In July, 1954, the next unit which extended the freeway to Seventh Street was placed into service.

On March 1st of this year the first unit of the Central Freeway which branches from the Bayshore at Division Street extended to skyway in a westerly direction to Mission Street. This was followed by the opening of the southward extension of the Bayshore Freeway from Alemany Boulevard to Third Street on March 30th.

Then on May 26th a downtown extension of the freeway from Eighth Street to Fourth Street was opened. Thus, after a six-year period of concerted effort representing a construction expenditure of $23,000,000, a total length of six miles of modern highway facility is now serving motorists in San Francisco.



Opening Significant

While the connecting link with the Bay Bridge is sandwiched in along the previously completed unit and as such does not add to the length of the completed freeway network, the opening of this final unit of the Bayshore is significant. For the first time, a substantial number of vehicles approaching or leaving the Bay Bridge were able to make full use of the freeway, thus affording a substantial measure of relief from traffic congestion for streets in the downtown, south of Market, area.

Aerial photo of Bayshore Freeway approach to San Francisco-Oakland Bay Bridge. Left foreground is 13th Street connection to Mission Street. In right foreground is Bayshore Freeway leading south. In the center is the new connection to the Bay Bridge.

The engineering achievement in providing an artery of high utility from a traffic standpoint also added to the aesthetic qualities of the metropolis. The elevated roadways of the freeway in San Francisco afford motorists an excellent opportunity to view the splendor of her world-famous skyline as they approach the central district of the city. The magnificence of the view has appropriately led to the local designation of the elevated freeway system as skyways.

Project Wins Award

To complement the beauty of the vista from the roadway of the skyway structures the construction has attained distinction in yet another manner. The unit of the viaduct first to be finished which terminated with ramps connecting to Ninth and Tenth Streets at Bryant Street was judged by the American Institute of Steel Construction to be the most beautiful Class II steel bridge opened in 1954. This award was on the occasion of an annual nation-wide competition which includes bridges costing over $500,000 and having no span over 400 feet.

UPPER—Wendell F. Pond, who designed the Bayshore Freeway Bridge, shows President Mellon of San Francisco Chamber of Commerce the plaque presented to F. W. Panhorst, Bridge Engineer, by the American Institute of Steel Construction. LOWER —Official caravan stops on new Bay Bridge approach for ribbon-cutting ceremony.

Presentation of a stainless steel plaque to the Division of Highways by the American Institute of Steel Construction was made during the opening ceremonies.

With the completion of the San Francisco terminus of the Bayshore Freeway accomplished, work is already under way on the eastward extension of the skyway which will be known as the Embarcadero Freeway. On the westerly fringe of the central district, preparation of plans and acquisition of rights of way are being pressed for the continuation of the Central Freeway. Meanwhile, studies are under way by the engineering staffs of the Division of Highways and the City of San Francisco for additional freeway facilities which, when completed, will result in an integrated modern transportation network in San Francisco.

Nov - Dec 1955

"Open Water" Fill

Unique Project Is Nearing Completion

By VINCENT O. SMITH, Senior Highway Engineer

On November 9, 1955, a contract was awarded to Guy F. Atkinson Co. for completion of the grading of one of the most unusual and interesting highway projects ever attempted. This portion of Bayshore Freeway, between the intersection of Third Street and Bayshore Boulevard in San Francisco and South San Francisco, will cross an arm of San Francisco Bay approximately two miles wide, bypassing one of the most congested sections of highway in the Bay area.

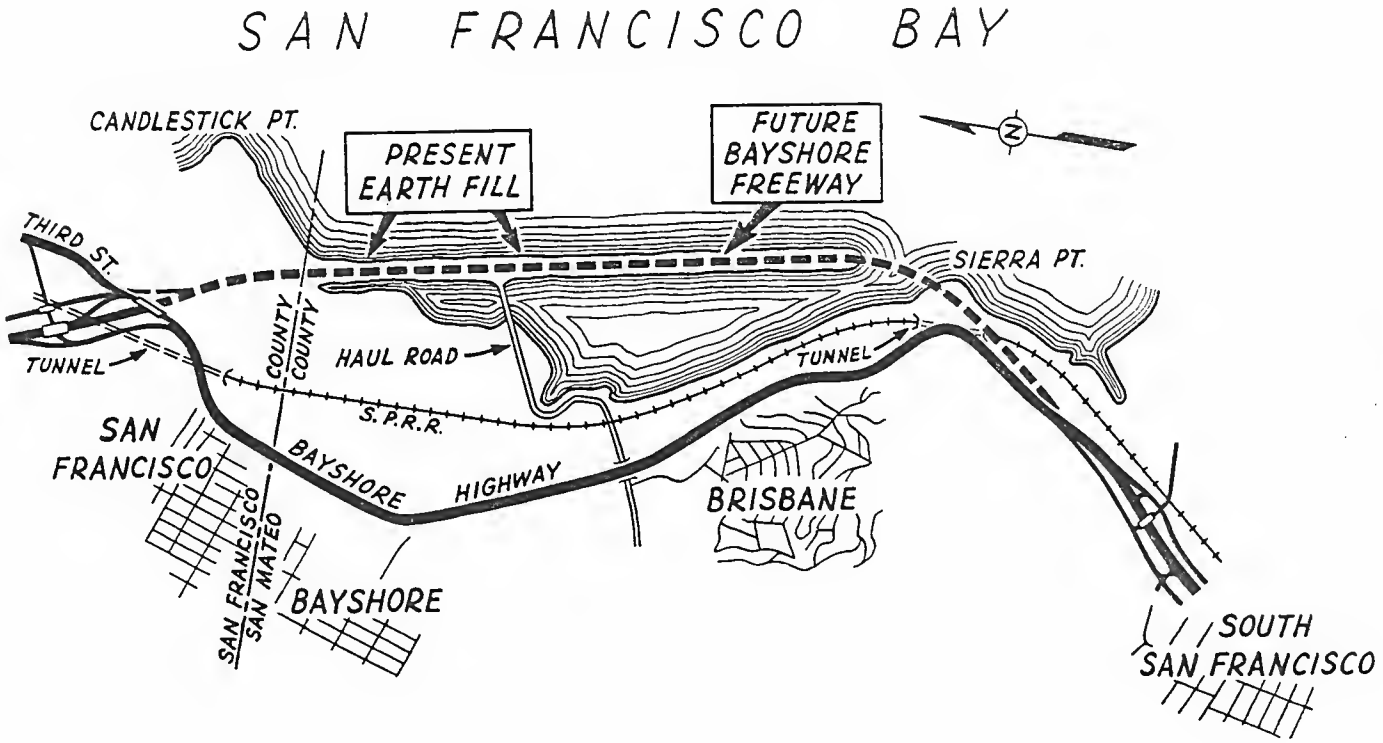
The need for additional highway facilities to handle the increasing traffic between San Francisco and the fast developing peninsula area became apparent in the mid-1930's and numerous traffic studies were made to determine the type and extent of expansion that would best alleviate the growing congestion. Due to the highly developed industrial sections, substandard alignment, grades, and constricted right of way on the existing route through the Visitacion Valley area, it was determined that the most economical and desirable solution was to bypass this area with a new location. This would provide two facilities through this area with a new freeway for through traffic and the existing route to serve local traffic.

Several Routes Studied

Studies of several routes bypassing this area led to recommendation of the present route. It subsequently was adopted and declared a freeway by the Highway Commission in July, 1941.

Since the new route crossed an arm of San Francisco Bay, with underlying mud ranging in depth from a few feet to nearly 80 feet, construction presented a major problem. Comprehensive studies were made to determine the most feasible and economic type of method of building this project. After eliminating the possibility of a causeway the two methods most carefully analyzed and compared were: (1) displacing the mud with dry fill by end dumping and (2) several variations of predredging the mud to provide a reasonably stable embankment with a minimum of mud displacement.

Because of large cuts on each end of the project and the fact that an ample quantity of borrow material was readily available from nearby sources, it was determined that substantial savings would be realized if the end dump mud displacement method would provide a stable embankment. Since this method of construction had never been used on such a large scale with dimensions and conditions resembling those to be encountered, it was questioned whether the fill could be successfully con-



Fill for open water section of Bayshore Freeway across Candlestick Cove. Widening at center of picture is location where reinforced concrete box culverts will be constructed to equalize water level.

structed in this manner. Hence to determine the feasibility of the proposal funds were made available and a contract was let in January, 1952, to construct an experimental section of fill by end dumping.

Mud Fill

Material for this contract was obtained from the right of way and was placed using 20 cubic yard carryalls and tournapulls. The fill was advanced on a 400-foot-wide front in an attempt to float the fill with a minimum of mud displacement. As the fill progressed, it was determined by borings that much greater penetration and displacement of mud was occurring than had been originally estimated. Calculations showed this greater penetration would allow the width to be reduced and still obtain reasonable stability so the fill was advanced further into the bay at a width of 300 feet.

Reducing the width caused greater displacement, so the fill was narrowed again. The remainder of the experimental fill unit was constructed 250 feet wide, being completed in August, 1952.

Based on the success of obtaining a reasonably stable fill over mud of a maximum depth of 40 feet on this first contract, a second experimental project was recommended to be placed by the same method to determine the feasibility of construction over mud which reached a depth of 80 feet.

Overhead Crossing

This second contract was awarded in June, 1953, and it included building an overhead crossing over eight tracks of the Southern Pacific Railroad and nearly two miles of haul road to a borrow site west of the existing Bayshore Highway. To reach the center line of the proposed freeway fill it was necessary to cross 1,200 feet of the bay with the haul road which was to be constructed 30 feet wide over mud that reached a depth of 60 feet. Construction of a fill of this width resulted in nearly 100 percent displacement of the soft bay mud and provided a road over which nearly 3,000,000 cubic yards of fill material has been hauled with only normal grading for maintenance.

The successful completion of this haul road confirmed further the feasibility of the method of construction, so instead of feasibility, our main concern during construction of the second experimental fill became placing the fill in such a manner as to obtain a uniform displacement of mud both laterally and longitudinally.

Uniform Displacement

If the fill could be placed so that a uniform displacement of mud could be obtained, differential settlement would be a minimum and only normal maintenance would be required.

Borings were made during construction to determine the depth of displacement, and records of quantities and methods of placement were correlated with these borings to determine factors affecting displacement.

Numerous variable factors were found that influenced displacement, the prime ones being:

1. The shape of the advancing face of the embankment.
2. The type of equipment used to place the fill material.
3. The rate at which the fill was placed.
4. The elevation at which the fill was carried.
5. Stoppages.
6. The type of material of which the fill was constructed.
7. Strength of the underlying mud.
8. Depth of the underlying mud.
9. Tide action.

A change in any of these factors caused others to vary and resulted in a change in displacement. Controls had to be established and varied during construction to meet the conditions at hand.

... Continued on page 28

View of open water section of fill for Bayshore Freeway across Candlestick Cove, Sierra Point in foreground. Bath railroad and highway will be relocated across the Point to the right of existing facilities. Purpose af railroad relacation is to provide additional tracks. Freeway will be carried over railroad on structure on salid ground at Sierra Paint.

"OPEN WATER" FILL

Continued from page 9 . . .

Effects of Stoppages

Using the information and experience gathered on the two experimental fills, specifications were prepared designating the shape of nose, type of equipment, constant rate of production and the use of dynamite placed in the mud ahead of the fill to overcome the detrimental effects of stoppages. Fortunately, the majority of material obtained from the borrow site was very uniform and rocky in nature, ideal for placement in the mud. Using these controls, the elevation at which the nose was carried, and the rate at which the fill was advanced was varied to correlate with the depth and strength of the underlying mud, type of material, and the positon of the

SUMMARY OF COMPLETED FILL PROJECTS

Contractor	Cu. Yds. Placed	Sta. Limits	Inclusive Dates
Edward Keeble Co.*	418,000	6+00± to 20+00	Jan., 1952-Aug., 1952
Guy F. Atkinson Co.†	956,000	35+00± to 56+00±	Sept., 1953-June, 1954
Guy F. Atkinson Co.	1,953,000	56+00± to 110+00±	Aug., 1954-Oct., 1955
John Delphia Co.	450,000	20+00± to 35+00±	May, 1955-Oct., 1955
Excess Material from Projects in S. F.	230,000	20+00± to 35+00±	Jan., 1952-Sept., 1955
To'al	4,007,000		

* First experimental project. † Second experimental project.

tide. This procedure gave satisfactory results in obtaining uniform displacement of mud on the two filling contracts just completed.

It is estimated that an additional quantity of 1,200,000 cubic yards of fill will be required to complete the embankment. This material is being placed under the current contract on which work was recently started. Included in this contract is the construction of an overpass over the railroad tracks at Sierra Point and box culverts to equalize the water level in the lagoon that will be enclosed by the freeway embankment. One more contract will be required to cover the paving of this freeway bypass. It is expected that bids for this final project will be called for in 1956, in coordination with progress on the current contract so as to provide a continuous freeway from the central district of San Francisco to the heart of the peninsula at the earliest possible date.

NEW EXPRESSWAY

Continued from page 13 . . .

that a small amount of color was discovered.

Old Trestle Removed

Another interesting problem was the removal of an old railroad trestle and truss structure used by the Camino, Placerville and Lake Tahoe Railroad. The structure was replaced by a grade crossing at Washington Street. The railroad company removed the rails from the structure, but it became the responsibility of the contractor to remove the remainder. The contractor wanted to use the truss portion to place over one of our structures so he could use overweight roadway equipment, and therefore wanted to save the truss at all costs. Dismantling and loading the structure without dropping it gave everyone some bad moments, but the project was completed successfully and the end results of building a bridge over a bridge gave the contractor an economical hauling arrangement.

This 1.5-mile new facility will save through motorists from five minutes to an hour in time, depending on traffic volumes, and will provide for easier circulation of local traffic on Main Street.

Bay Bridge Is One Of Seven Modern Engineering Wonders

Included in the Seven Modern Engineering Wonders of the United States designated by the American Society of Civil Engineers is the San Francisco-Oakland Bay Bridge. This world-famous span was designed and built under the personal supervision of the late Charles H. Purcell, State Highway Engineer and later Director of the Department of Public Works of California.

The other projects named are:

Chicago Sewage Disposal System—involving Herculean excavation; reversal of the flow of the Chicago River and construction of the world's largest treatment works.

Colorado River Aqueduct—serving 66 municipalities in Southern California with water brought almost 250 miles, traversing desert and mountains and involving part canal, part tunnel and part siphon.

Empire State Building, New York City—tallest building man has constructed.

Grand Coulee Dam and Columbia River Basin Project, Washington—an irrigation marvel; has world's largest hydroelectric power plant.

Hoover Dam, Arizona-Nevada—world's highest.

Panama Canal—greatest of geographical surgical operations; of distinguished service to entire world.

MONTHLY TRAFFIC COUNTS

Regular monthly traffic counts for October, 1955, show an increase of 6.8 percent over October, 1954. They show a decrease of 5.7 percent under September, 1955. Based on a five-year average, October counts normally show a decrease of 5.5 percent under September.

For the first 10 months of 1955 the monthly counts show an increase of 5.5 percent over the same period of 1954.

Comparing October, 1955, with October, 1954, passenger vehicles show an increase of 6.9 percent and freight vehicles show an increase of 6.8 percent. Freight vehicles represented 20.3 percent of the total week-day traffic.

Posts in Division of Water Resources Temporarily Filled

The following temporary assignments in the Division of Water Resources, effective November 2d, were announced by Frank B. Durkee, Director of Public Works:

Harvey O. Banks, Assistant State Engineer, in addition to his regular duties with respect to water rights and water quality investigations, assumed the duties of State Engineer.

State Engineer A. D. Edmonston retired from state service on November 1st.

Walter G. Schulz, Principal Hydraulic Engineer, took over the duties of G. H. Jones, Assistant State Engineer, in charge of flood control projects and supervision of safety of dams.

Jones retired from state service effective November 1st.

William L. Berry, Principal Hydraulic Engineer, assumed the duties of T. B. Waddell, Assistant State Engineer, in charge of state-wide investigations and related matters.

Waddell retired from state service on November 1st.

The three staff members to whom the assignments have been made are not being appointed to the vacancies resulting from the retirement of their superiors, Durkee stated. They will continue to carry on their regular duties for the time being.

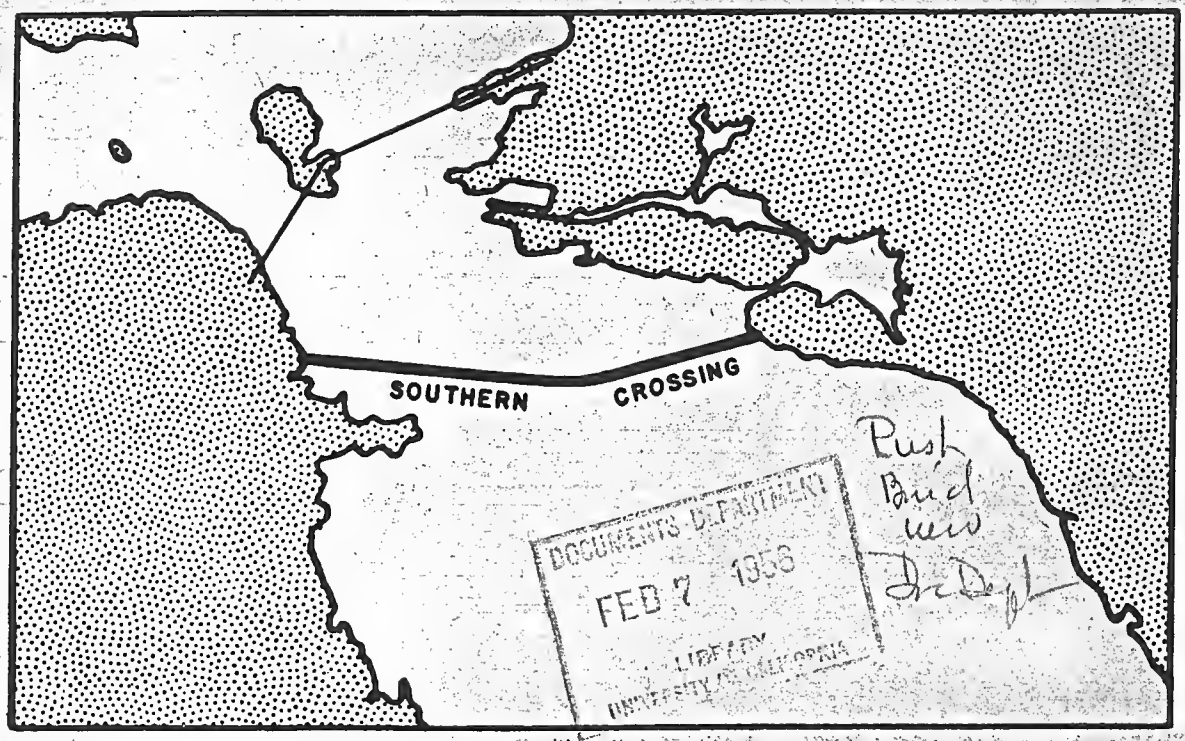
Civil service examinations for the position of Assistant State Engineer will be held.

The State Personnel Board has not been requested to hold an examination for the position of State Engineer. This will make it possible for the Legislature in March of next year to have a free hand in discussing the formation of a new Department of Water Resources without having to consider the vested rights of any individual with respect to the position of State Engineer.

STIFF PENALTY

The maximum penalty for drunken driving in South Africa, says the California State Automobile Association, is a $2,800 fine or 10 years in prison, or both.

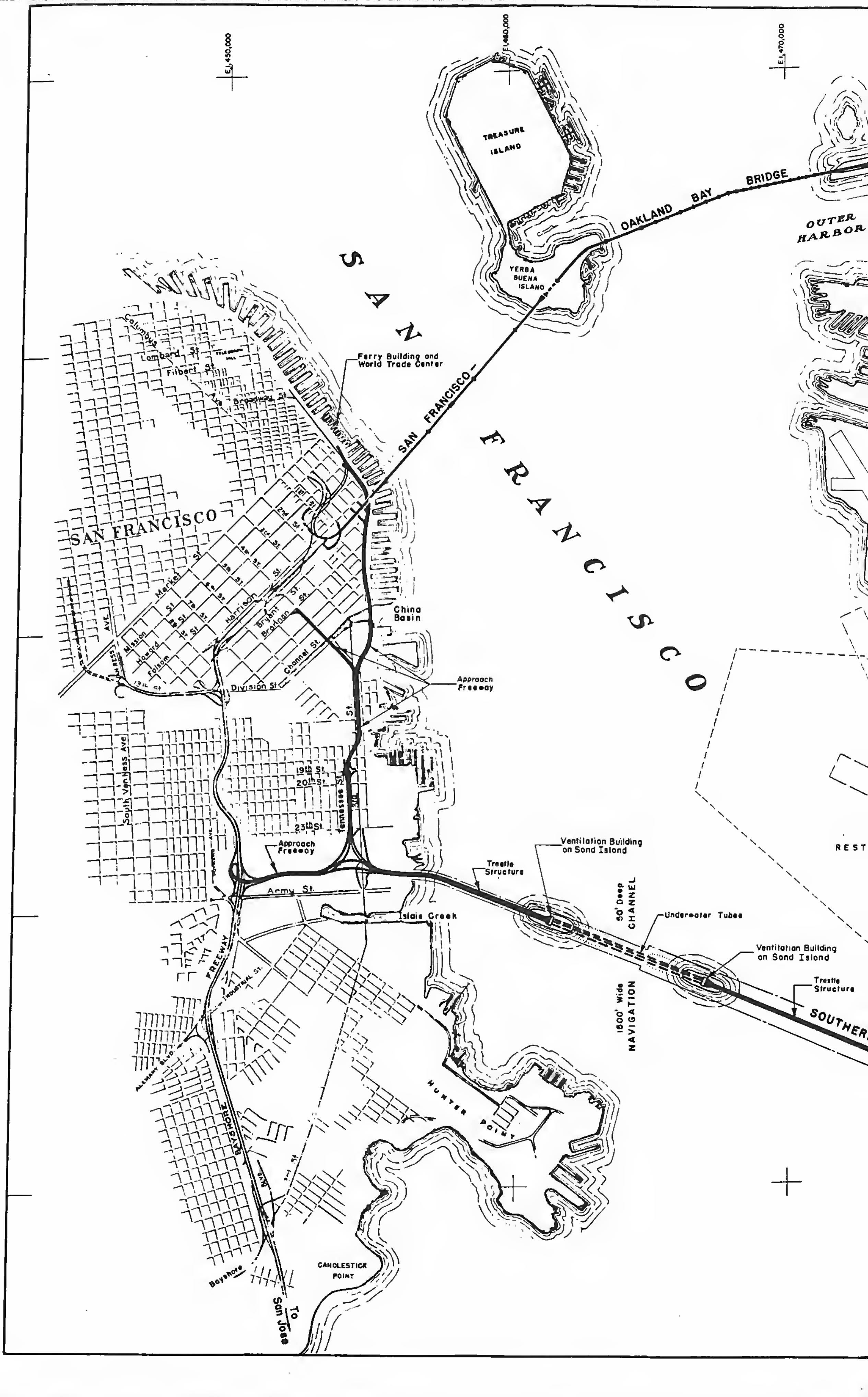
SOUTHERN CROSSING
OF SAN FRANCISCO BAY



Rush
Bridges

DIVISION OF SAN FRANCISCO BAY TOLL CROSSINGS
DEPARTMENT OF PUBLIC WORKS
STATE OF CALIFORNIA

REPORT OF DECEMBER 1955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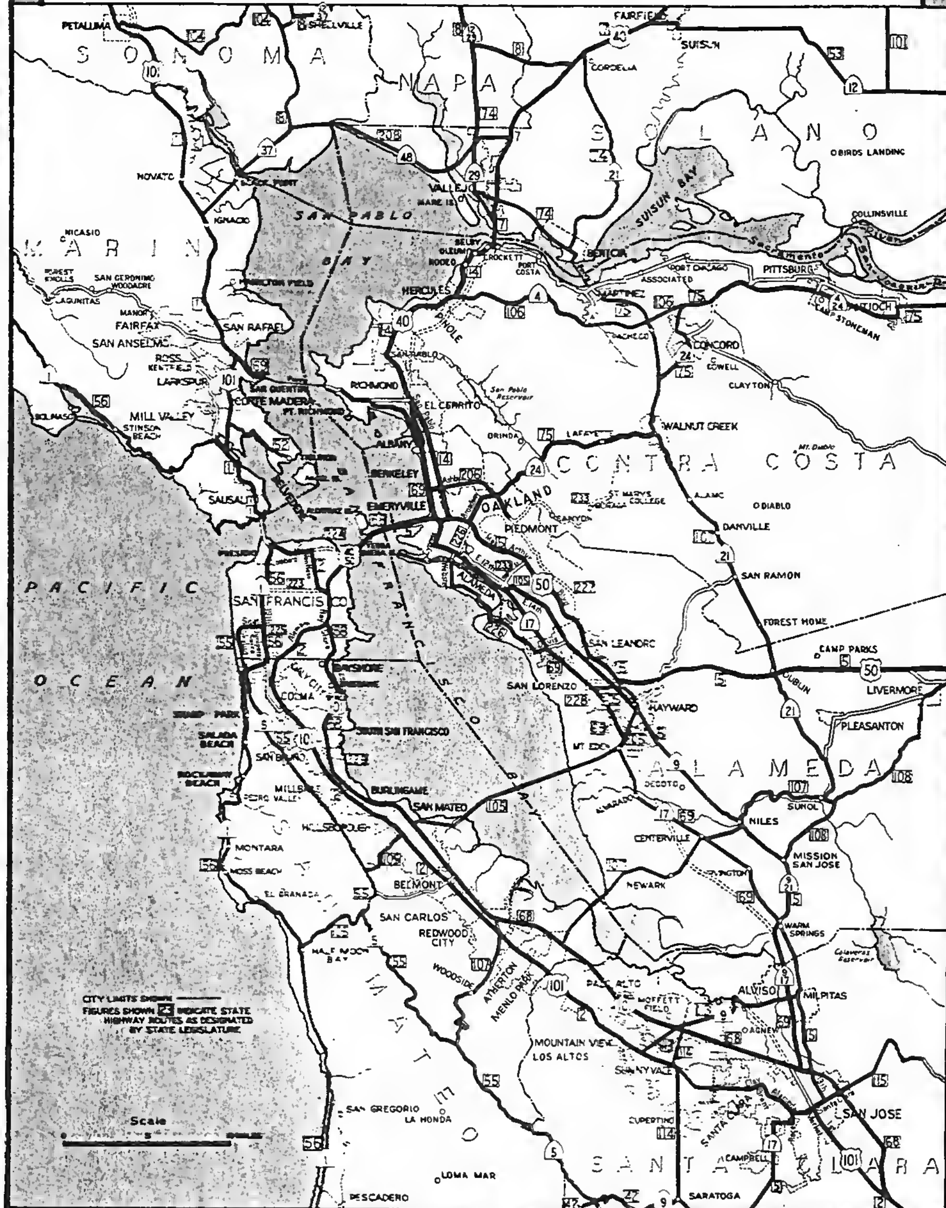
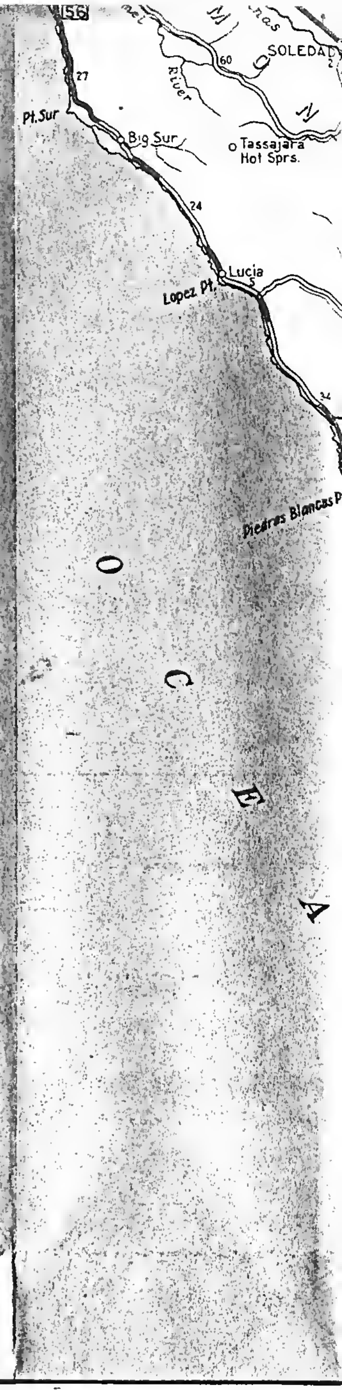
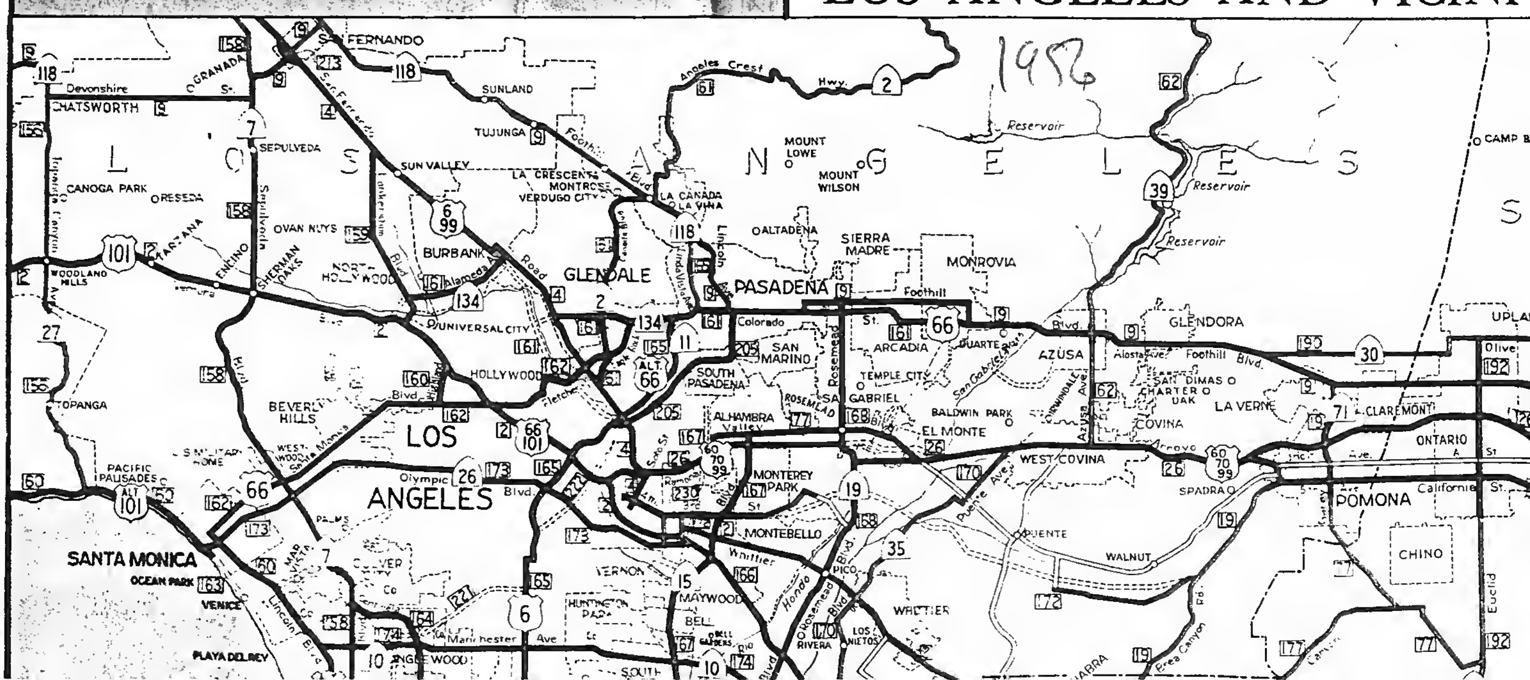
E 1,470,000
TREASURE ISLAND
YERBA BUENA ISLAND
OAKLAND BAY BRIDGE
OUTER HARBOR
SAN FRANCISCO
SAN FRANCISCO
SAN FRANCISCO
Ferry Building and World Trade Center
China Basin
Approach Freeway
Approach Freeway
Ventilation Building on Sand Island
Trestle Structure
50' Deep CHANNEL
Underwater Tubes
Ventilation Building on Sand Island
Trestle Structure
1500' Wide NAVIGATION
SOUTHER
Islais Creek
Army St.
HUNTER POINT
CANDLESTICK POINT
Bayshore
To San Jose
BAYSHORE
FREEWAY
Market St.
Mission
Howard
Folsom
Harrison
Bryant
Brannan St.
Channel St.
Division St.
Lombard St.
Filbert St.
Broadway St.
South Van Ness Ave.
19th St.
20th St.
23rd St.
Tennessee St.
REST

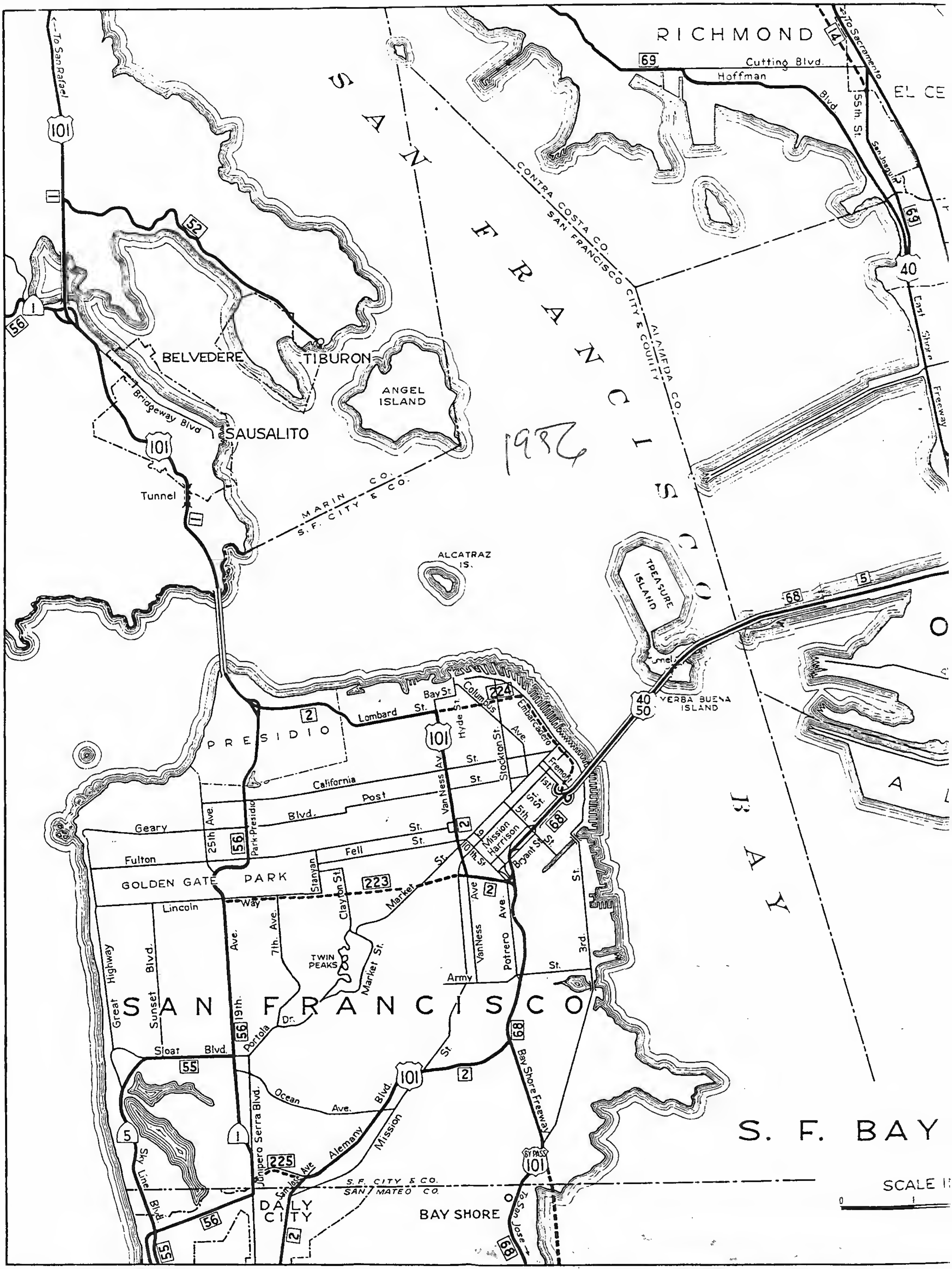
SAN FRANCISCO AND VICINITY





LOS ANGELES AND VICINITY





RICHMOND
EL CE
Cutting Blvd.
Hoffman
Blvd.
55th. St.
San Joaquin
To Sacramento
To San Rafael
SAN FRANCISCO BAY
CONTRA COSTA CO.
SAN FRANCISCO CITY & COUNTY
ALAMEDA CO.
East Shore Freeway
BELVEDERE
TIBURON
ANGEL ISLAND
SAUSALITO
Bridgeway Blvd
Tunnel
MARIN CO.
S.F. CITY & CO.
ALCATRAZ IS.
TREASURE ISLAND
YERBA BUENA ISLAND
PRESIDIO
Lombard St.
Bay St.
Hyde St.
Columbus Ave
Embarcadero
Stockton St.
California St.
Post St.
Geary Blvd.
Fulton St.
Fell St.
25th Ave.
Park Presidio
Van Ness Av
Fremont
1st. St.
5th St.
Mission
Harrison
Bryant St.
10th St
GOLDEN GATE PARK
Stanyan
Clayton St
Market St.
Lincoln Way
7th. Ave.
TWIN PEAKS
Van Ness Ave
Potrero Ave.
3rd. St.
Army St.
Great Highway
Sunset Blvd.
19th. Ave.
SAN FRANCISCO
Portola Dr.
Sloat Blvd.
Ocean Ave.
Junipero Serra Blvd.
Alemany Blvd.
Mission St.
San Jose Ave
Bay Shore Freeway
Sky Line Blvd.
S.F. CITY & CO.
SAN MATEO CO.
DALY CITY
BAY SHORE
To San Jose
S. F. BAY
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